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THE MARCONIGRAPH

An Illustrated Monthly Magazine of WIRELESS TELEGRAPHY

EDITED BY J. ANDREW WHITE

Volume I. **OCTOBER, 1912** **No. 1**

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GUGLIELMO MARCONI

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THE MARCONIGRAPH

An Illustrated Monthly Magazine of WIRELESS TELEGRAPHY

Vol. I. October, 1912 No. 1

IN acquainting our readers with the men prominently identified with Marconi interests we deem it fitting to present in our first issue a brief sketch of Commendatore Guglielmo Marconi, LL.D., D.Sc., the inventor who gave to the world the greatest discovery of the age.

Born at Bologna, Italy, in the year 1874, of Irish extraction on his mother's side, he combines possibly more rare qualities in association than can be found in any single personage holding the limelight today. While his features are familiar to the public at large through repeated reproduction of his photographs and his every movement has been assiduously chronicled by the press of the country, it is rare, indeed, that one is found who has come into personal contact with Mr. Marconi. There are two good reasons for this: first, his activities take him here, there and everywhere, until it is hard to know just where he will be at any specified time; and, again, when he is located, he is usually too busy to talk. Add to this an inherent aversion to publicity and you have the reason why so little is known of the wonderfully magnetic personality of the man.

But to his associates he is at once a source of delight and admiration. A charming manner, a keen sense of humor, a dignified yet courteous and affable mien, withal diffusing an impression of the indomitable energy that stamps him the undaunted pioneer and prodigious worker—that is Marconi as they know him.

Let us consider for a moment a few of the circumstances which have influenced the molding of his character. It is difficult for us to realize—now that the imperishable greatness of his work has been recognized by many governments and seats of learning and numerous honors have been showered upon him—the disheartening manner in which Marconi was treated by scientific men when he first announced that he had succeeded in sending wireless signals, chiefly repetitions of the letter "S," across the Atlantic. It was nonsense; it was deliberate deception; the reading was in error; were some of the comments. Another prank of the "young man with a box," one scientist termed it. It is amusing to recall this extraordinary treatment to-day, now that we know the signals were really sent and really received; but who among us would have quietly pursued our work in the face of such odds?

Marconi was then in his twenty-seventh year. For more than six years he had labored with the problem of wireless communication, basing his experiments upon the discovery of other scientists that if metallic bodies are charged with opposite electricity and then suddenly discharged, energy in the form of electric waves is transmitted into space and could be detected only over very short distances. It was not believed that the effects of electric waves could be recorded over a distance greater than a few hundred yards—hardly further, in fact, than the space over which a voice would carry. The application of these waves to actual telegraphy was not realized until 15 years ago when communication was established between England and France, over a distance of 30 miles. Even then it was the general opinion that the curvature of the earth would be an insurmountable barrier to long-distance transmission.

It is not our purpose to enter into the details of the brilliant work quietly carried on which led to the crowning achievement—the transmission of electric signals across the Atlantic Ocean, but the foregoing may be interesting as giving an idea of what Marconi had to contend with. Now that wireless telegraphy has triumphed everywhere, ships have been succored, lives saved and the ends of the earth are being brought nearer together by the Marconi towers which have been raised all over the world—not forgetting that the system is a tremendous commercial success—Marconi can afford to smile and look back with indifference upon those who scorned and impeded him. But he doesn't—he is too occupied with his ambition to do even greater things, too absorbed in the promotion of the interests of the Marconi system.

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Training Marconi Operators

How Young Men are Prepared at the Marconi School for Service Aboard the Great Ocean Steamships

As Seen by the Father of an Applicant

Photos by Underwood & Underwood.

EVER since the day when I first scrambled over the back fence of our yard at home and set forth on a tour of investigation into the merits of the outside world, I have been intensely interested in telegraphy. Whether or not my absorption in the subject was as great on that particular day as it has since become, is a detail involving the relative importance of mental and physical impressions upon the juvenile mind; for my earliest view of a telegrapher at work was gained through the ruination of my first pair of breeches and my reputation as an obedient child. In any event, the idea of some day becoming a manipulator of the mysterious key was given birth on that occasion and the consequence of that forbidden pilgrimage, though undoubtedly painful, probably only increased my interest.

The railroad station of the small town in which I had entered the world was a center of activity which dwarfed into insignificance any other attraction which came within my wide-eyed vision; and it was there I was found two hours after my disappearance. The old negro mammy who at the time served as guardian of my destiny, has since told me that three sticks of peppermint candy were necessary before I could be induced to cease wailing over being

Class session during one of the lectures on the engineering methods of wireless telegraphy given by the Instructing Engineer.

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Perforating the tape for the transmission of wireless messages to ships at sea.

dragged away from the good-natured operator who had been instilling into my child mind the rudiments of telegraphy. My father did not view the matter in the same light, not that I suppose he had any particular prejudice against the telegraphic art, but he deemed it necessary to impress upon me, through the medium of a slipper, the danger of little boys toddling about where great express trains thundered by.

I can well remember, although it is many, many years ago, how as I lay in my little white bed that night I wrestled with the problem of the injustice of the world, the inexplicable ways of grown-ups with little boys, the wonder of the newly discovered mysteries of the world of men—and determined at all costs to some day become a telegrapher!

Which aspiration, in due course, was realized. I became a very good telegrapher. That, too, was many years ago. I now am a railroad official, I hold an important office; what it is matters no more than my identity, and that matters little except that I am the father of a fine, strapping boy of nineteen years. Just what business to place my boy in has been to me a very great problem which I have only recently solved. What I have to say is directed at fathers who are still searching for a suitable occupation for their sons. I have decided that my boy shall become a wireless operator.

A word or two as to how I reached this conclusion might be of interest.

I have said before that during practically all of my life I have been intensely interested in telegraphy. That is probably because to it I owe my present excellent position. I started as a railroad operator, served my apprenticeship in virtually every branch of the railroad business as time went on, and eventually reached the executive office which I now hold. But I have always attributed my rapid advancement to the early knowledge of railroading gained while operating a key. Naturally, as I watched my boy growing up, I had a vague idea that his start in life should be as that of his father.

But my views were destined to be changed. One day, about a year ago, I had some important calculations to make; I was busy with other duties and turned the figures over to one of my younger subordinates. He returned with the correct solution in what seemed to me scarcely a moment. Knowing that it would have taken me at least an hour to figure it out myself, I was curious to know how he had achieved such a rapid solution. He

A student learning to manipulate a modern receiving set.

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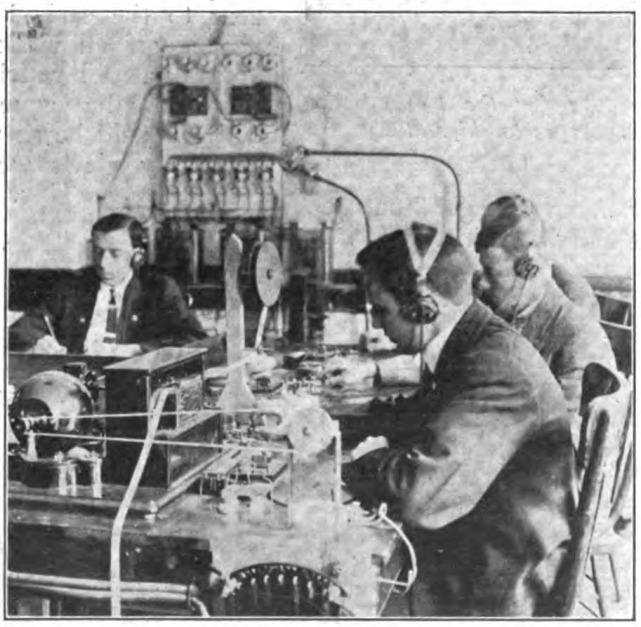
showed me his method of figuring. I was amazed. I asked him where he had learned it. "Why, everyone uses that method now," he replied. "It was taught to me while in college."

Here was something I hadn't thought much about. College? I had never been to college. Yet I certainly knew more about railroading than the others. But then my hair was gray and I was old; for the first time I realized how old I was in comparison to the other executives. Had they been to college? I decided to investigate.

I learned that they had. Without exception, each one was a university graduate. Well then, where were the men who like myself had worked up from the ranks? There were none. As I looked deeper into the matter the realization was forced on me, even as I tried to combat it, that the days when railroad officials were recruited from the ranks no longer existed.



Sending messages to the students. The men to the right are sending at three different speeds to three separate classes. The apparatus in the foreground is automatically sending messages to the speed class.

I had a long talk with my son that night about his ambitions. He had very decided views on some subjects. He didn't want a college education; considered it a four years' waste of time; medicine or law didn't attract him, nor did architecture or civil engineering. But on the other hand he had no definite idea as to what business he cared to follow, except that he had always imagined he would some day be taken by me into the railroad organization. I have always been a firm believer in allowing a boy to follow his own inclinations to a great degree, so I did not show any opposition on the college question, but explained to him that the day was past when one could, as his father had done, rise to a big railroad position when starting as a telegraph operator. Then, my old hobby coming to mind, I asked him if he would like to become a telegrapher.

"I should like very much to, father," he answered, "but not on a wire system. I want to be a wireless operator."

This was truly amazing, but when he followed with his ideas of the opportunities in the wireless service, of the new positions made through legislation requiring two operators aboard ship, of the rapid increase of stations and efficiency, and of the newness of the industry and future possibilities, I was dumbfounded at the precocity of my own son. Alone, he had figured out opportunities, big ones, greater by far than in any other business that I could think of.

Since then, I have looked into the subject and have found that the possibilities even exceed what I thought at first. The best indication of my belief is that my son is to become a wireless operator. I have had him enrolled in the Marconi School which has just been opened in New York and he is to be taught both the Marconi wireless telegraph system and the Marconi method of handling commercial business, after

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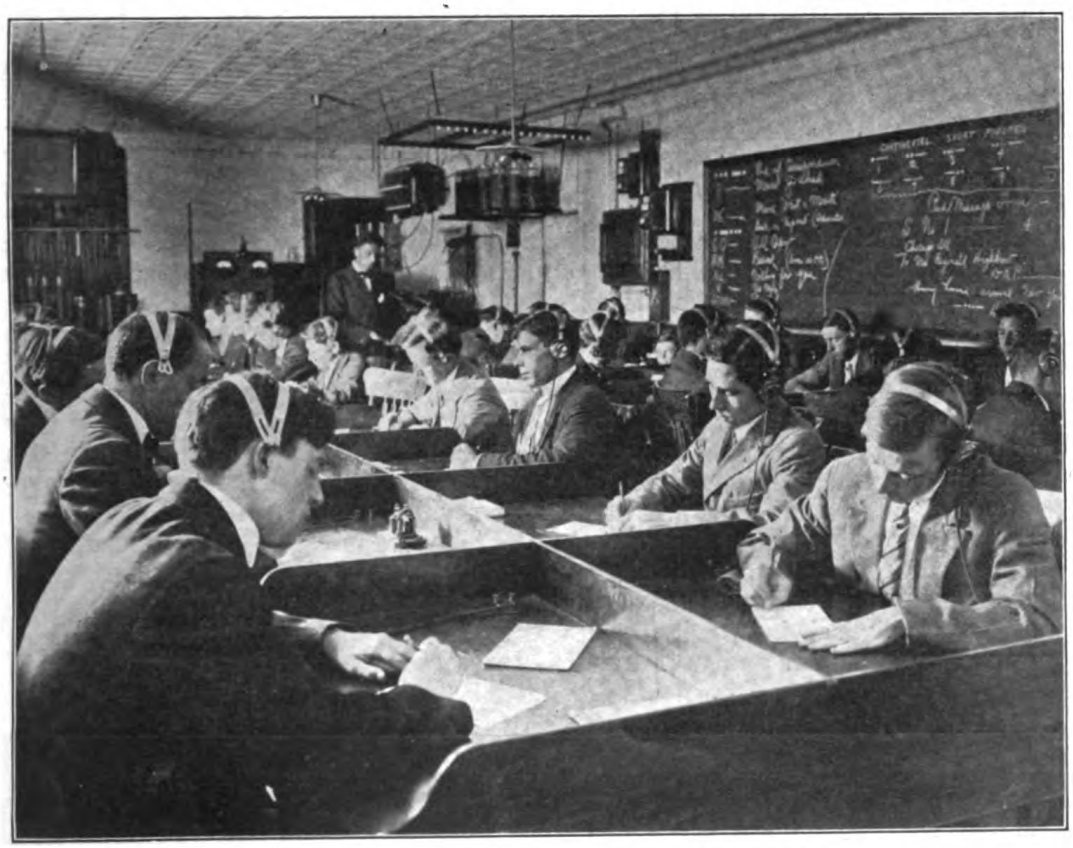
mastering which it is understood that he is to be employed by the Marconi Company as a ship operator as soon as a vacancy occurs.

I will not go into detail as to how and what I learned to affect this decision, for any one can look about him and see the rapid growth and increased importance of wireless telegraphy; but I feel that fathers of boys such as mine will be interested in knowing what I learned on my recent visit to the Marconi School.



Future wireless operators taking messages in the Continental Code.

On the second floor of a large building almost in the shadow of the Brooklyn Bridge—29 Cliff street, to be exact—I found the boys who are soon to have the safety of the great ocean steamships in their hands. They were seated at long tables with head-'phones on their ears copying messages that were being sent to them through an automatic transmitter. In front of them were transmitting keys, enabling them to communicate with one another. The operators' tables are so connected that the instructor in charge can send to the entire class simultaneously or the class may be divided into three sections, each section obtaining individual instruction. At the time of my visit the Wheatstone automatic transmitter was in use. By means of this device messages which had been previously perforated on tape were being sent to the class. The speed can be regulated to any degree desired. The apparatus is a duplicate of those used at the high power transmitting stations when sending press and commercial messages to ships at sea.

I learned that the Continental Code alone is used by the Marconi Company, but that students who are to be employed at land stations are taught the American Morse as well. This is necessary on account of the wire connections with the Postal and Western Union Telegraph Companies.

My inquiry as to the requirements of applicants was answered that stu-

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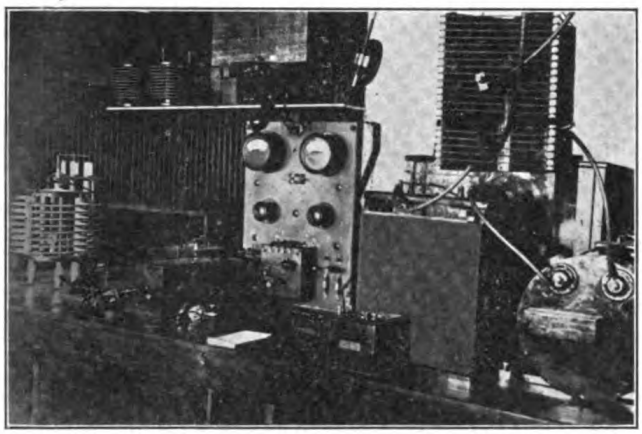
dents who have a slight knowledge of electricity and are sufficiently familiar with the Morse Code to send the alphabet are preferred. However, those who have no knowledge whatever of these will be accepted if they can satisfy the instructor as to their capabilities after a personal interview. Applicants must not be less than 19 years of age though.



The modern complete sending and receiving apparatus, part of the school equipment.

The hours of the school are from 10 A. M. to 12 noon and from 1 to 4.30 P. M., Saturdays from 10 A. M. to 12 noon. The time required to become proficient, it was said, was from three to twelve months of daily instruction. Expressing my surprise at this period I learned that unlike the wire telegraph operator, the wireless man must have a thorough technical knowledge of the circuits, construction and operation of his apparatus. As he is required to obtain a Government License Certificate he must be able to draw a circuit diagram of the complete apparatus, effect a temporary repair of any part of the equipment which might prove defective; know how to search and locate troubles; thoroughly understand the theory regarding the operation of each part of a wireless set and understand motor generators and accessory apparatus. In addition he must know how to change wave lengths and to adjust a given set to resonance with a wavemeter.

Thoroughness is the keynote. The student is taught both the theory and practice of the wireless art in an electrical course of daily lectures and is prepared not only for the operation of

Operators copying messages transmitted from ships at sea.

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the Marconi Wireless System, but is enabled to pass the Government license examination. Experimental apparatus is constructed by the students as a part of their course.

After acquiring a certain proficiency they are permitted to receive actual messages direct from ships at sea. The class room is fitted with the latest types of receiving apparatus connected to an aerial on the roof of the building. The operating departments of the Marconi Company are also in the same building which gives the student a close view of the actual performance of commercial wireless.

I found that it is necessary for one desiring to enter the school to fill out an application blank; after this has been accepted a tuition fee of fifteen dollars is required. This covers the entire course and is payable in two instalments, ten dollars upon entrance and five dollars after a period of two weeks. The entire amount is refunded to the student after one year's service in the Marconi Wireless Telegraph Company of America.

Speaking of prospects, the Instructing Engineer in charge told me that after some time in the ship service, at salaries ranging from $30 to $60 a month, rooms and meals of course included, those operators who show good records and have a thorough understanding of the commercial operation of wireless telegraphy, may be promoted to positions at land stations or as ship inspectors at the various ports. Others may become traveling inspectors and some be employed as assistants in the engineering departments or in the actual construction or installation of land or ship stations.

Before I left I enrolled my son as a student. I can see a particularly bright future for those who enter into this business, and am supremely satisfied with my son's location; for setting all future possibilities aside, I know of few openings for young men where only one year's training is required to qualify them for a position which will yield an income sufficient to make them independent of family assistance.

Wireless, Taxi and Tug Aid Arrest

Wireless messages were used by two Philadelphia detectives a short time ago to effect the arrest of Rode Ballagon as he was on his way to his native country on the North German Lloyd steamer *Graf Waldersee.*

Incidentally the liner and also the steamship *Haverford,* on which vessel it was first thought Ballagon had engaged passage, was delayed while the detectives searched both steamers for the man, who was wanted at Harrisburg on the charge of aggravated assault.

About twenty minutes prior to the departure of the *Haverford,* which was the first to leave her dock, Captain of Detectives Cameron received a telephone message from the Harrisburg authorities requesting the arrest of Ballagon, who, it was stated, had probably engaged passage on the *Haverford.*

With only a short time to reach the dock, the two detectives detailed to arrest the man, were instructed to engage a taxicab, and they reached Washington avenue wharf just as the steamer was about to depart.

After making known the object of their mission the detectives were allowed aboard the steamship and they began their search for Ballagon, but he was not among the passengers.

In the meantime the *Graf Waldersee* left an adjoining dock and started on her voyage. The detectives thought that Ballagon might be on the *Waldersee,* which was quite a distance down the river.

They communicated with Captain Cameron and he advised them to secure a tugboat, which was furnished them by the steamship company. Then a chase after the *Graf Waldersee* began and the big liner was overtaken opposite League Island.

Following the captain's suggestion, a message was quickly transmitted to a wireless receiving station on top of a building near City Hall and delivered to Captain Cameron, who, in replying, instructed the detectives to make Ballagon a prisoner regardless of his plea of innocence.

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The New Wireless Law

The New Act to Regulate Radio-Communication in the United States and its Provisions for Government, Commercial and Amateur Stations

FOLLOWING close upon the passage of the law requiring steamers carrying fifty or more persons to be equipped with efficient apparatus capable of transmitting messages at least 100 miles, an auxiliary set of the same range with an independent power supply, and that two skilled operators be in charge, comes the signing by President Taft of the bill to regulate radio-communication. This was done on August 16; the law goes into effect four months from its passage, or on December 13th.

This law should be an effective one as its provisions would seem to eliminate the difficulties which have hitherto arisen in the transmission of messages by Government, commercial and amateur stations. Each class of station has been amply provided for in conformity with its requirements. Each commercial and amateur station must be licensed if its transmitting range extends beyond the boundaries of the State in which the apparatus is located. Licenses are not required for Government stations, but every United States station on land and sea is to have special call letters designated and published in the list of radio stations distributed by the Department of Commerce and Labor. A maximum fine of five hundred dollars and the forfeiture of the offending apparatus is the penalty provided any one violating this section.

Licenses will be issued only to citizens of the United States or Porto Rico or to companies incorporated within that territory. These are to specify the ownership and location of the station and other particulars for its identification and to enable its range to be estimated; and state the purpose of the station. Those stations in actual operation at the date of passage of the act will have to give satisfactory proof of actual operation on that date; state the wave length or wave lengths authorized for use by the station for the prevention of interference and the hours during which the station is allowed to work; these statements are to be contained in the license. Every license is subject to the regulations of the Act, which we print further on, and to any additional regulations which may be established from time to time. Also in time of war or public peril or disaster, the President may order the closing of any station and the removal of its apparatus, or may order the closing of any station and the removal of its apparatus, or may authorize their use or control by Government departments upon just compensation to the owners.

Every such apparatus at all times while in use and operation must be in charge or under the supervision of some one licensed for that purpose. Those so licensed who fail to observe and obey the regulations of this or subsequent Acts or fail to enforce obedience of them from an unlicensed person serving under their supervision, in addition to the punishments and penalties prescribed, may suffer the suspension of their licenses for a period not exceeding one year. A fine of one hundred dollars or imprisonment for two months, or both, is the maximum penalty for any person employing an unlicensed person or for anyone without a license to serve in charge or in supervision of the use and operation of the apparatus. However, in case of emergency the Secretary of Commerce and Labor may authorize a collector of customs to issue a temporary permit to a ship operator on a vessel subject to the radio ship Act.

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Special temporary licenses may be granted to stations actually conducting experiments, allowing them to carry on special tests, using any amount of power or wave lengths, at such hours and under such conditions as will insure the least interference with the working of Government or commercial stations.

The regulations of the Act (s. 6412) are as follows:

NORMAL WAVE LENGTH.

First—Every station shall be required to designate a certain definite wave length as the normal sending and receiving wave length of the station. This wave length shall not exceed six hundred meters or it shall exceed one thousand six hundred meters. Every coastal station open to general public service shall at all times be ready to receive messages of such wave lengths as are required by the Berlin convention. Every ship station, except as hereinafter provided, and every coast station open to general public service shall be prepared to use two sending wave lengths, one of three hundred meters and one of six hundred meters, as required by the international convention in force: *Provided,* That the Secretary of Commerce and labor may, in his discretion, change the limit of wave length reservation made by regulations first and second to accord with any international agreement to which the United States is a party.

OTHER WAVE LENGTHS.

Second—In addition to the normal sending wave length all stations, except as provided hereinafter in these regulations, may use other sending wave lengths: *Provided,* That they do not exceed six hundred meters or that they do exceed one thousand six hundred meters: *Provided further,* That the character of the waves emitted conforms to the requirements of regulations third and fourth following:

USE OF A "PURE WAVE."

Third—At all stations if the sending apparatus, to be referred to hereinafter as the "transmitter," is of such a character that the energy is radiated in two or more wave lengths, more or less sharply defined, as indicated by a sensitive wave meter, the energy in no one of the lesser waves shall exceed ten per centum of that in the greatest.

USE OF "SHARP WAVE."

Fourth—At all stations the logarithmic decrement per complete oscillation in the wave trains emitted by the transmitter shall not exceed two-tenths, except when sending distress signals or signals and messages relating thereto.

USE OF "STANDARD DISTRESS WAVE."

Fifth—Every station on shipboard shall be prepared to send distress calls on the normal wave length designated by the international convention in force, except on vessels of small tonnage unable to have plants insuring that wave length.

SIGNAL OF DISTRESS.

Sixth—The distress call used shall be the international signal of distress, . . . — — — . . .

USE OF "BROAD INTERFERING WAVE" FOR DISTRESS SIGNALS.

Seventh—When sending distress signals, the transmitter of a station on shipboard may be tuned in such a manner as to create a maximum of interference with a maximum of radiation.

DISTANCE REQUIREMENT FOR DISTRESS SIGNALS.

Eighth—Every station on shipboard, wherever practicable, shall be prepared to send distress signals of the character specified in regulations fifth and sixth with sufficient power to enable them to be received by day over sea a distance of one hundred nautical miles by a shipboard station equipped with apparatus for both sending and receiving equal in all essential particulars to that of the station first mentioned.

"RIGHT OF WAY" FOR DISTRESS SIGNALS.

Ninth—All stations are required to give absolute priority to signals and radiograms relating to ships in distress; to cease all sending on hearing a distress signal; and, except when engaged in answering or aiding the ship in distress, to refrain from sending until all signals and radiograms relating thereto are completed.

REDUCED POWER FOR SHIPS NEAR A GOVERNMENT STATION.

Tenth—No station on shipboard, when within fifteen nautical miles of a naval or military station, shall use a transformer input exceeding one kilowatt, nor, when within five nautical miles of such a station, a transformer input exceeding one-half kilowatt, except for sending signals of distress, or signals or radiograms relating thereto.

INTERCOMMUNICATION.

Eleventh—Each shore station open to general public service between the coast and vessels at sea shall be bound to exchange radiograms with any similar shore station and with any ship station without distinction of the radio systems adopted by such stations, respectively, and each station on shipboard shall be bound to exchange radiograms with any other station on shipboard without distinction of the radio systems adopted by each station, respectively.

It shall be the duty of each such shore station, during the hours it is in operation, to listen in at intervals of not less than fifteen minutes and for a period of not less than two minutes, with the receiver tuned to receive messages of three hundred meter wave lengths.

DIVISION OF TIME.

Twelfth—At important seaports and at all other places where naval or military and private or commercial shore stations operate in such close proximity that interefereence with the work of naval and miltary stations cannot be avoided by the enforcement of the regulations contained in the foregoing regulations concerning wave lengths and character of signals emitted.

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such private or commercial shore stations as do interfere with the reception of signals by the naval and military stations concerned shall not use their transmitters during the first fifteen minutes of each hour, local standard time. The Secretary of Commerce and Labor may, on the recommendation of the department concerned, designate the station or stations which may be required to observe this division of time.

GOVERNMENT STATIONS TO OBSERVE DIVISION OF TIME.

Thirteenth—The naval or military stations for which the above-mentioned division of time may be established shall transmit signals or radiograms only during the first fifteen minutes of each hour, local standard time, except in case of signals or radiograms relating to vessels in distress, as hereinbefore provided.

USE OF UNNECESSARY POWER.

Fourteenth—In all circumstances, except in case of signals or radiograms relating to vessels in distress, all stations shall use the minimum amount of energy necessary to carry out any communication desired.

GENERAL RESTRICTIONS ON PRIVATE STATIONS.

Fifteenth—No private or commercial station not engaged in the transaction of bona fide commercial business by radio communication or in experimentation in connection with the development and manufacture of radio apparatus for commercial purposes shall use a transmitting wave length exceeding two hundred meters, or a transformer input exceeding one kilowatt, except by special authority of the Secretary of Commerce and Labor contained in the license of the station: *Provided,* That the owner or operator of a station of the character mentioned in this regulation shall not be liable for a violation of the requirements of the third or fourth regulations to the penalties of one hundred dollars or twenty-five dollars, respectively, provided in this section unless the person maintaining or operating such station shall have been notified in writing that the said transmitter has been found, upon tests conducted by the Government, to be so adjusted as to violate the said third and fourth regulations, and opportunity has been given to said owner or operator to adjust said transmitter in conformity with said regulations.

SPECIAL RESTRICTIONS IN THE VICINITIES OF GOVERNMENT STATIONS.

Sixteenth — No station of the character mentioned in regulation fifteenth situated within five nautical miles of a naval or military station shall use a transmitting wave length exceding two hundred meters or a transformer input exceeding one-half kilowatt.

SHIP STATIONS TO COMMUNICATE WITH NEAREST SHORE STATIONS.

Seventeenth — In general, the shipboard stations shall transmit their radiograms to the nearest shore station. A sender on board a vessel shall, however, have the right to designate the shore station through which he desires to have his radiograms transmitted. If this cannot be done, the wishes of the sender are to be complied with only if the transmission can be effected without interfering with the service of other stations.

LIMITATIONS FOR FUTURE INSTALLATIONS IN VICINITIES OF GOVERNMENT STATIONS.

Eighteenth—No station on shore not in actual operation at the date of the passage of this Act shall be licensed for the transaction of commercial business by radio communication within fifteen nautical miles of the following naval or military stations, to wit: Arlington, Virginia; Key West, Florida; San Juan, Porto Rico; North Head and Tatoosh Island, Washington; San Diego, California; and those established or which may be established in Alaska and in the Canal Zone; and the head of the department having control of such Government stations shall, so far as is consistent with the transaction of governmental business, arrange for the transmission and receipt of commercial radiograms under the provisions of the Berlin convention of nineteen hundred and six and future international conventions or treaties to which the United States may be a party, at each of the stations above referred to, and shall fix the rates therefor, subject to control of such rates by Congress. At such stations and wherever and whenever shore stations open for general public business betwen coast and vessels at sea under the provisions of the Berlin convention of nineten hundred and six and future international conventions and treaties to which the United States may be a party shall not be so established as to insure a constant service day and night without interruption, and in all localities wherever and whenever such service shall not be maintained by a commercial shore station within one hundred nautical miles of a naval radio station, the Secretary of the Navy shall, so far as is consistent with the transaction of governmental business, open naval radio stations to the general public business described above, and shall fix rates for such service, subject to control of such rates by Congress. The receipts from such radiograms shall be converted into the Treasury as miscellaneous receipts.

SECRECY OF MESSAGES.

Nineteenth — No person or persons engaged in or having knowledge of the operation of any station or stations, shall divulge or publish the contents of any message transmitted or received by such station, except to the person or persons to whom the same may be directed, or their authorized agent, or to another station employed to forward such message to its destination, unless legally required so to do by the court of competent jurisdiction or other competent authority. Any person guilty of divulging or publishing any message, except as herein provided, shall, on conviction thereof, be punishable by a fine of not more than two hundred and fifty dollars or im-

(*Continued on page 42.*)

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Wireless in the War Game

The Aerial Scouts do Effective Work, Saving the Blue Army by Wireless Messages During the Recent Manoeuvres

Photos by Underwood & Underwood.

ONE morning a few weeks ago the humble business men of New York were unceremoniously brushed aside by thousands in khaki and their ears, accustomed as they are to the racket and clamor of the elevated trains and clanging of street cars, were deafened by the tramp of marching men and the strident notes of countless bugles. Those who had not been previously warned blinked and wondered what it all meant. A few, conspicuous by their gray hairs and the upright bearing that betokens early militia training, hastened to spread the news. The war game was on in grim earnest. The Atlantic fleet had been smashed—theoretically—and an invading enemy had not only crumpled up the American line at Boston and pushed it back westward to Albany, but a second invading army of 100,000 had landed near New Bedford and was marching toward New York.

These men, regiment after regiment of them, were leaving the city to meet this invading army and a big battle was imminent in the neighborhood of Bridgeport. Then it was explained that none of these sturdy sons, among whom are members of our very best families, were in actual danger. That this was the beginning of the annual war drama played under the observation of Brigadier-General T. H. Bliss, U. S. A., and the division staff of the National Guard of

The field apparatus at Gen. Smith's headquarters with the Army of Blues.

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Receiving a message from the air scouts of the signal corps.

New York, who determine the result of each engagement. And that their deductions are based on the actions of the umpires who represent the bullets. The observers consider all the possibilities and lessons that each contingency furnishes.

After which the civilian went down to his desk speculating on the probable invasion of New York, and whether the delights of engaging in a conflict that had the air of quite the real thing would compensate for tramping over the country in new shoes that needed breaking in and with deep dust as the most conspicuous thing in the landscape.

However, the boys all came back delighted with their experiences and loudly extolling their individual deeds of valor in the defense of New York. While the city was in grave danger at times it was not captured; those who could be induced to leave off talking of themselves for a moment directly attributed the successful defense to the information transmitted by wireless from the aeroplanes of the signal corps.

For the first time the aviation section was tried out in American manœuvres and it was the accuracy of the wireless scout messages from the squad which enabled the officers in command of the Blue Army of defense to organize an orderly retreat after failing to repulse the invading force at a critical point. The observations, transmitted from an altitude of 2,500 feet, not only enabled the commander to withdraw his forces but to intrench them in a strong position and establish a new and powerful defense.

During all the engagements both armies were furnished with information as to the other's position by their own aviation detachment of the Signal Corps. Through the wireless messages officers of the two armies were able to mystify each other. At more than one critical juncture orders were suddenly changed so that the enemy had no conception of the sudden flank movements that vitally influenced the result of the decisive battles.

So efficacious was the work of the aviation squad that in all future manœuvres wireless information of the enemy's position will occupy a prominent place in the strategic deliberations of the officers.

The station in the camp of the Red Army of invasion had a range of 200 miles.

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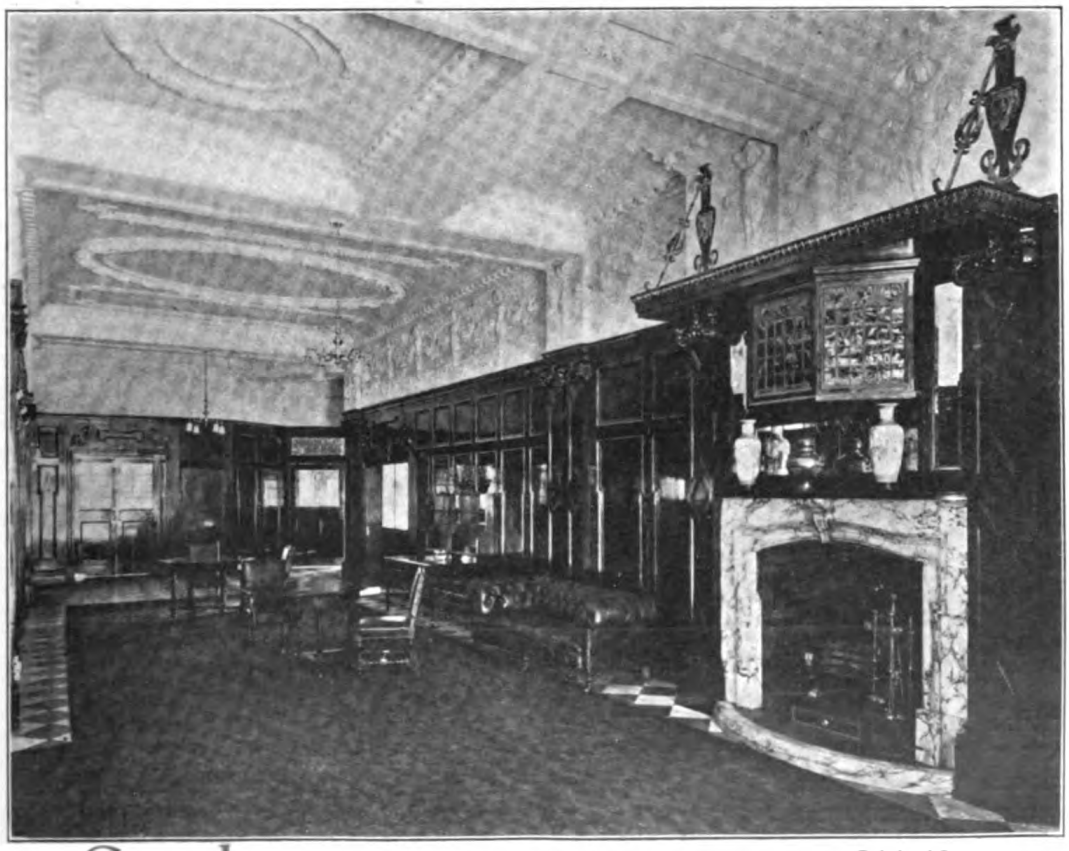
The Home of Wireless

A Glimpse of the Building Occupied by the Parent Marconi Company in London

THE new Marconi headquarters in London stand as a monument to the progressiveness of the entire organization and effectively demonstrate what can be accomplished when master minds combine to secure efficiency without sacrificing tastefulness. Situated on the Strand, the main thoroughfare in London, the imposing building which houses the business offices of Marconi's Wireless Telegraph Co., Ltd., cannot fail to impress the passerby as being a fitting home for one of the most important commercial undertakings of the century. The exterior presents the massive proportions of the Florentine period of the Italian Renaissance, bold masses thickly fenestrated and surmounted by a carved frieze; the whole treatment stamping it as one of those restrained and dignified efforts of a great artist in architecture.

The artistic atmosphere of the whole design strikes one immediately on entering the main waiting hall near the entrance. This is paneled in the most beautiful fashion with Honduras mahogany, the fireplace being an important feature of the design. The frieze is a deep plaster cast setting, and the ceiling is richly ornamented. On the left-hand



The main waiting hall is paneled with Honduras mahogany.

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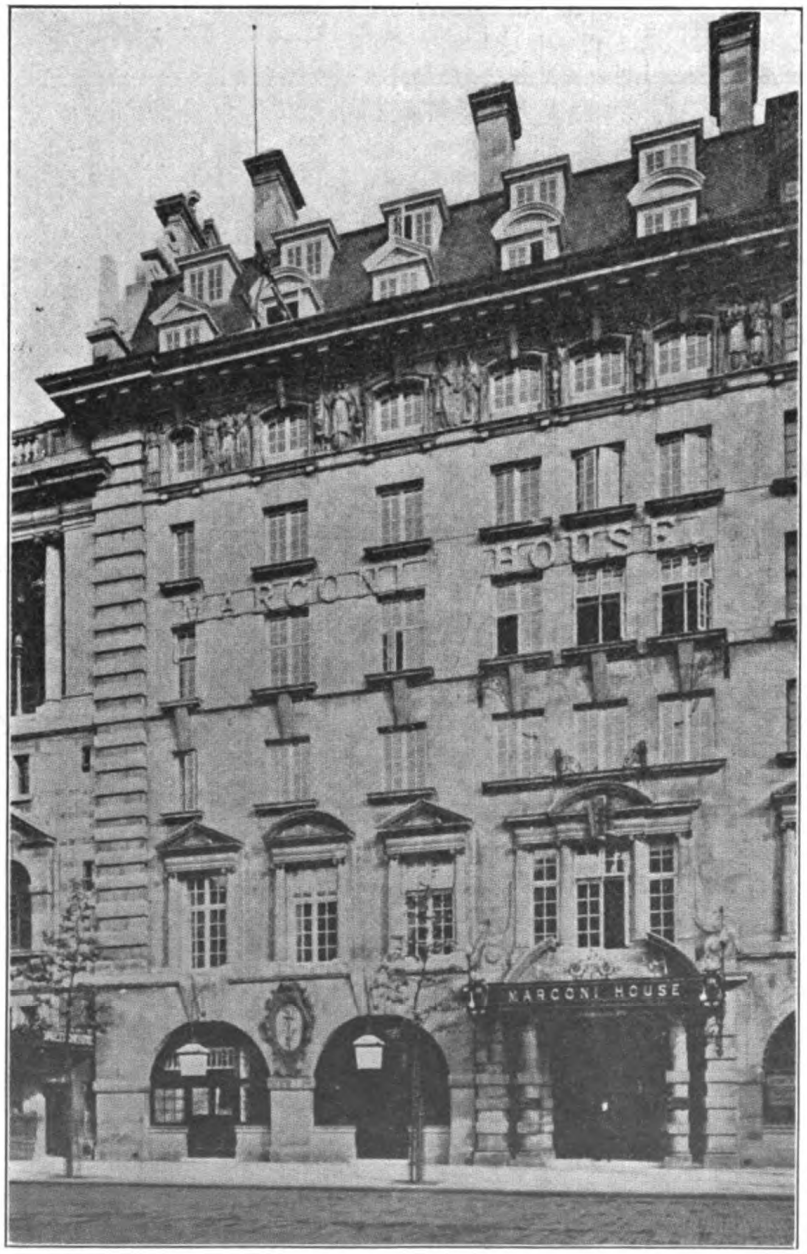
side of the hall is a small counter at which marconigrams can be received for transmission to all parts of the world. Next to that is a public telephone for the use of visitors waiting to keep appointments. The main elevator has a capacity of twelve passengers and an attendant. To the right of the waiting room is a telephone exchange containing three switchboards, one fitted with 100 lines for the inter-communication system of telephones, and the other two being trunk lines, each having five extra points and fifty extensions, making a total of ten extra lines and one hundred extensions. Past the telephone exchange is another set of large doors, which communicate with the Aldwych side of the building. These doors are used by the staff. On the same floor is a large room, 60 feet by 40 feet, which is used by the Transfer Department. This room



Outside view of the building from the Strand.

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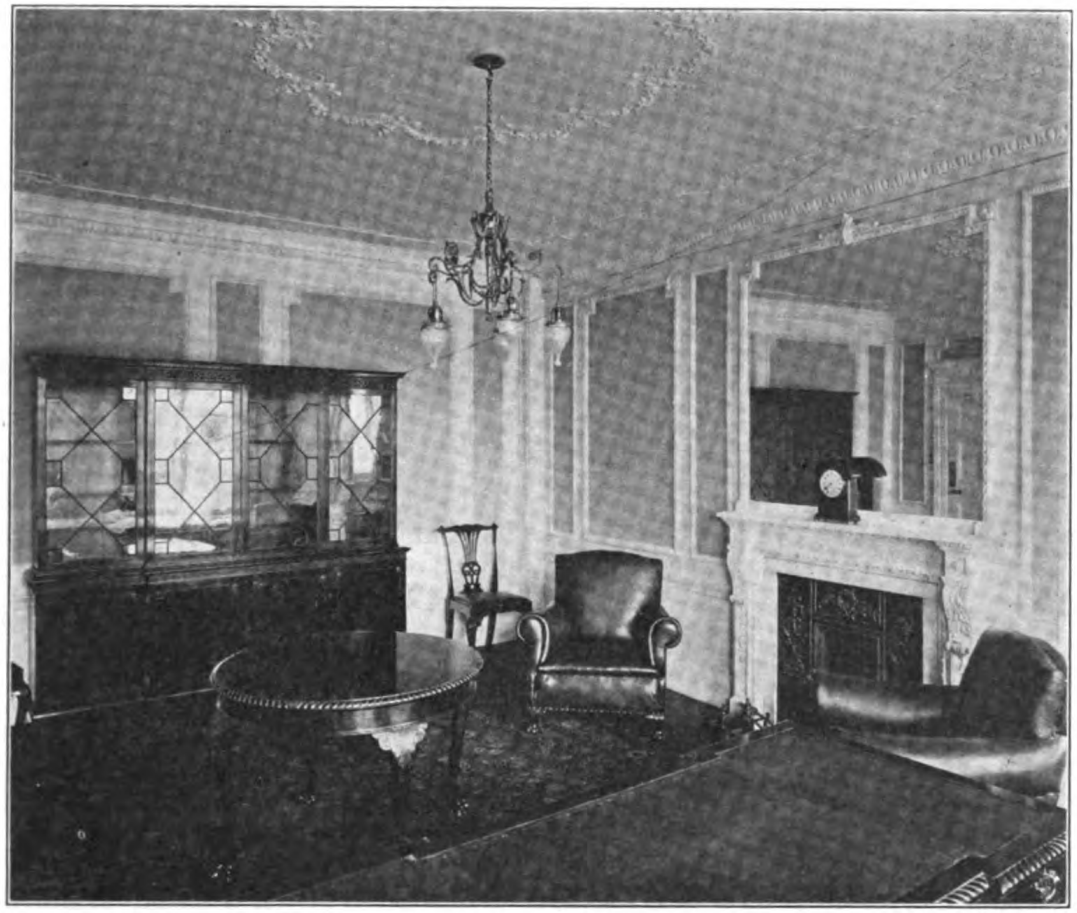

Mr. Marconi's room.

is fitted with a Honduras mahogany counter, equipped with three solid bronze grilles, in which are received the share certificates, vouchers, etc. All the desks in this office were specially made and are 6 feet long. The office is decorated in white, with a fine balcony running all round it, on which are employed about twenty dictaphone typists. From this balcony an electric conveyance for carrying dictaphone records communicates with each floor in the building. The whole of the electric light fittings in this room are of solid bronze, penny metal. The staff employed in this room numbers about twenty, so that, compared with the floor space, it will be seen that each man is provided with ample space. The postal room is situated at the end of this floor, and opens on to the street through a set of doors at which the mails are delivered. This room is also used as the central exchange for the pneumatic tube system installed throughout the offices. Another large room has been reserved on the Aldwych front for extension of the Traffic Department. A large elevator faces another entrance on the Aldwych side is used by members of the staff whose offices are on the Aldwych side of the building.

To the right of the main entrance off the Strand is the telegraph office, which is open night and day to receive marconigrams. This office is connected by means of a private wire to the Marconi station at Clifden, where Transatlantic business is dealt with. As a result of this private wire, the relaying of messages between London and Clifden is abolished, and marconigrams intended for all parts of the United States and Canada are now transmitted at a considerably increased speed.

The grand staircase leading from the

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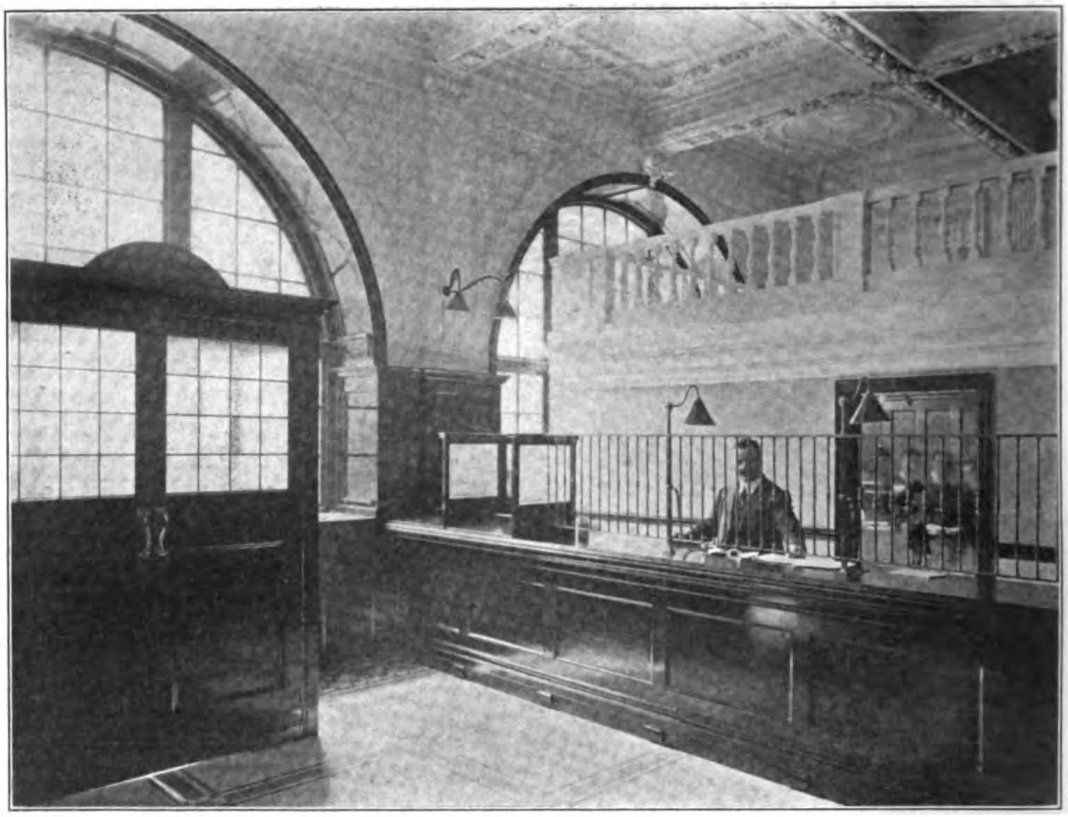
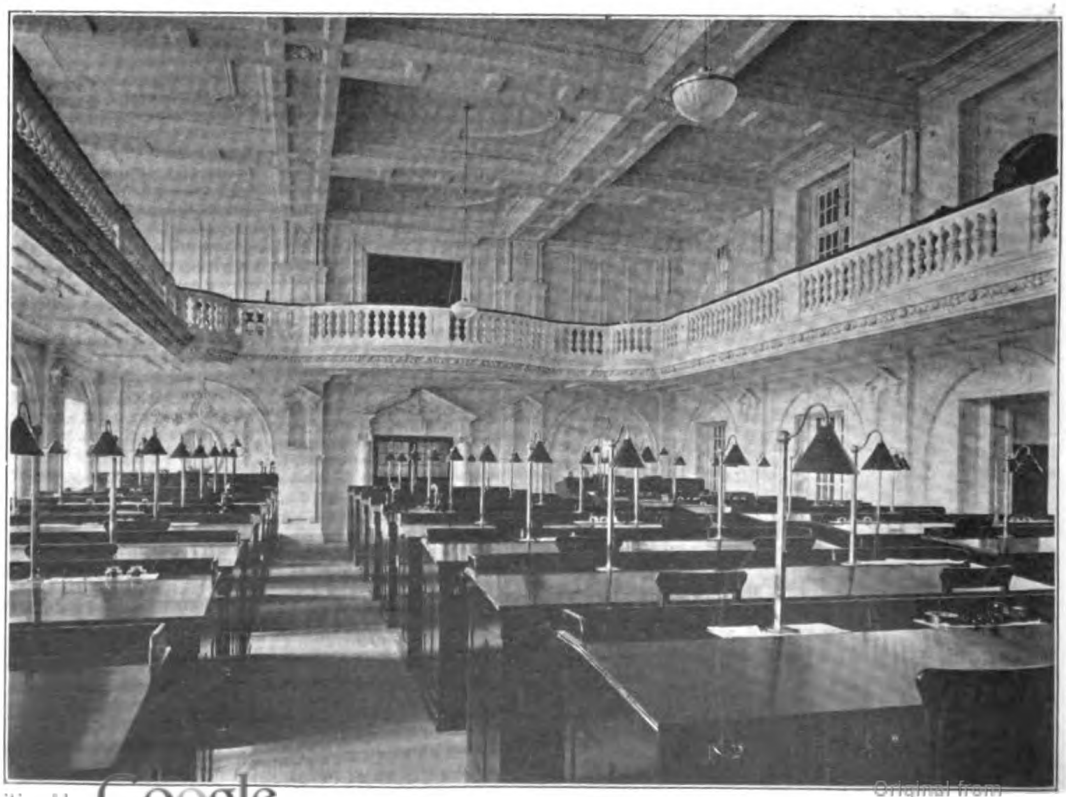


Public telegraph office with an entrance on the Strand.



Accountant's office, showing gallery used by [illegible]

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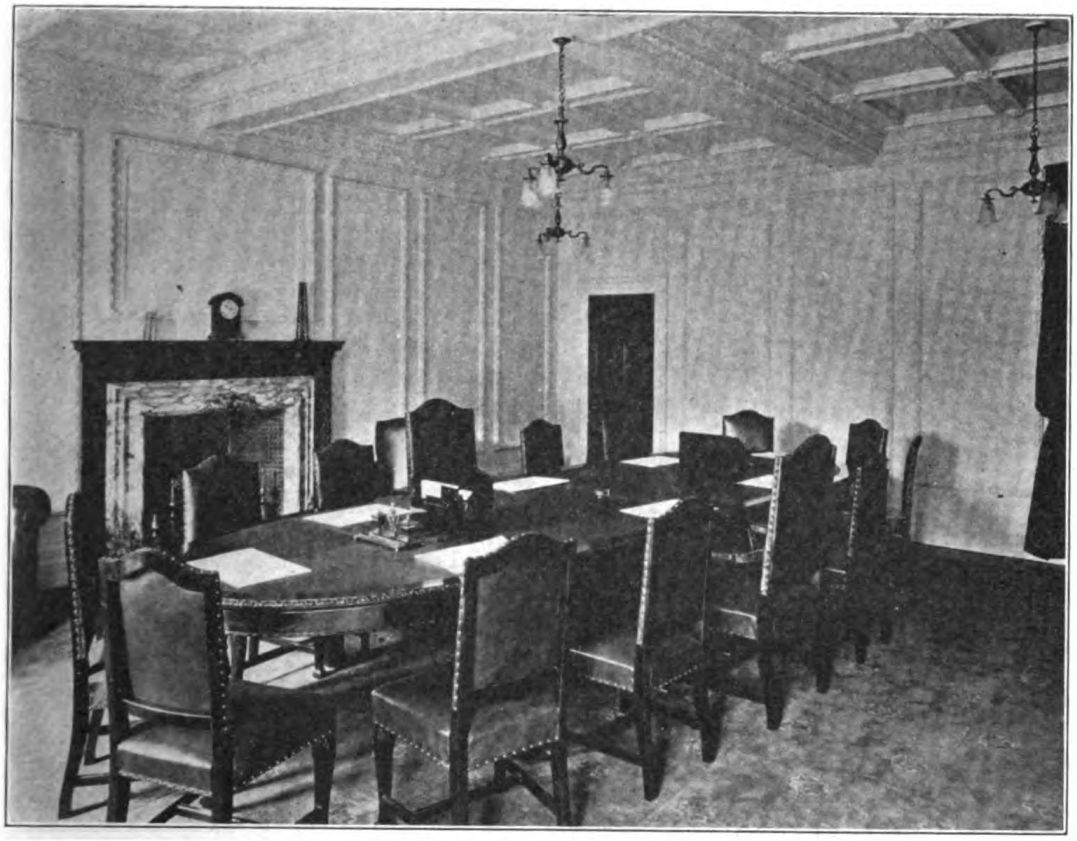

The Board room.

waiting room to all floors is 10 feet wide, and inserted on each landing are some very fine stained glass windows. The motto under the window on the first landing is, "I'll put a girdle round about the earth in forty minutes."

On the first floor is a large room overlooking the Strand, which is used by the managing director. This room has been furnished and decorated in the Adam style, the whole of the electric light fittings and other metalwork being in solid bronze. The walls have been paneled with rich mouldings, the panels painted a pale sage green, and the mouldings colored a scrambled white. The fireplace has a marble hearth and surround, and the grate and cheeks are of polished steel with bronze enrichments. Adjoining this room is the manager's office, which has been decorated in similar style. The mantelpiece is in carved mahogany, and the grate and cheeks in polished steel and bronze. The room adjoining this is used by the private secretaries and their assistants. In this room is also situated a pneumatic tube station. The large hall on this floor is used as another waiting room.

Another flight of stairs leads to the second floor. On the right are the rooms occupied by the secretary, the assistant secretary, and their typists, and the Board Room.

The latter has been tastefully and skilfully decorated and the electric light fittings here are also in solid bronze of a special design. To the left of the landing is the Accountant's Department, which is of similar dimensions to the Transfer Department—namely, 60 feet by 40 feet. A staircase leads to another balcony, which is used by draughtsmen. The ceiling is domed, and highly enriched with fine plaster work. Thirty-two new desks, each 10 feet long, have been provided, giving accommodation for sixty-four clerks. At the back of this office are the storerooms, lined with adjustable bookshelves, on which papers can be stored, and a large lift is installed, by means of which all books

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are conveyed to the strong room. Divided from this room by means of Honduras mahogany screens are the offices of the accountant, the assitsant-accountant, the cashiers, and their typists.

On the third floor are the offices of the technical staff, consisting of the chief engineer, the assistant engineer, other engineers, and technical clerks. These rooms overlook the Strand, and are partitioned off by means of Honduras mahogany screens.

A very light room on the right-hand side of the large waiting room is used by the chief draughtsman and drawing-office staff.

On the fourth floor the offices facing the Strand are occupied by Mr. Marconi, Mr. Marconi's private secretary, and the Patent Department. The other rooms on this floor have been allotted to the Field Station Department, the English edition of THE MARCONIGRAPH, the Publicity Department, and the Stationery Department, while the rooms overlooking the Aldwych side have been apportioned to first-class engineers, foreign agents, auditors, etc.

The fifth floor is occupied by the traffic manager and his staff. These offices lead up to the Ship Fitting Department, the chart room, operators' and inspectors' waiting rooms, etc.

A portion of the sixth floor has been reserved for the use of the housekeeper.

On the seventh floor there will be a large workshop and a room in which drawing-office tracings will be printed, also a dark room for photographic work, a drawing office, four large show rooms where working sets can be demonstrated, and all types of storage. An aerial system will eventually be placed on the roof for demonstration purposes. Other rooms on this floor have been equipped as a training school for operators.

A view of the transfer department.

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About a Certain Wireless 'Phone

They are telling a story about a well-known merchant whose name we withhold for obvious reasons.

This wide-awake business man was on a vacation. He had selected as a proper place to rest Longport, N. J., and he was at a pier at that resort one morning recently waiting with a number of other people for a boat to take him to Ocean City, when upon his ear fell a mysterious voice.

"Hulloa! Hulloa!" said the voice.

The business man looked about to discover to whom this salutation was addressed and from whom it came, but his neighbors were also looking about for the source, puzzled.

"Hulloa! Hulloa!" cried the voice, and since it seemed that some one should respond, the alert business man did so.

"Hulloa yourself," said he. "Who are you?"

"This is a wireless telephone," answered the voice from the ether. "I am talking from New York from the top of the World Building. This is William Blank, manager of the Jones Company," said the voice, and the name that he mentioned, singularly enough, was the name of a dear friend of the alert business man.

"Why, Mac," ejaculated that person, "how lucky that I should catch your message."

"Isn't it?" said the voice.

"Are you sure you hear me? Repeat my questions after me." And he put a number of questions, all of which the voice obediently repeated.

Finally, after considerable conversation and with many expressions of regard on both sides, the ethereal voice said good-by and the remarkable incident was closed.

Then the business man had time to observe that the crowd on the pier, which included his wife, had been listening with strained and wondering attention to the conversation.

"Give me your names as proof that you heard and that I did not dream this thing," he cried, and each person solemnly wrote his name in the memorandum book the business man proffered for that purpose.

Later, still seeking to substantiate the evidence of his senses, the business man called his friend of the Jones Company up over the long-distance telephone. He had difficulty in getting him, and it was not until 4 o'clock in the afternoon that he finally heard his voice over the wire.

The business man referred to the morning's conversation the two had had by wireless telephone. Mac, of the Jones Company, inquired if he had suddenly gone mad.

The business man explained and Mac roared. "I hadn't an idea you were so gullible," said he. "Some one has played a joke on you. I never saw a wireless telephone nor ever hope to see one. Read me the names on that list that you got from the people on the pier this morning.

The business man, his feathers considerably fallen, read.

He reached the name "Charles Hartley" before he was interrupted.

"Exactly," said Mac. "A friend of mine and a ventriloquist of ability, and I knew he was going to Longport. Oh, you easy fruit!"

And that's all the story, except that the business man, though he sought high and low, as the saying is, never found Mr. Hartley. Evidently that gentleman felt that a sudden disappearance would be a prudent thing for him. But he must have had enough fun out of the mystification of the crowd to compensate for any risk he ran of being hanged by an indignant mob.

Wandering Waves

A curious phenomenon in connection with wireless telegraphy has been observed in the neighborhood of the Clichy-Levallois Railway station, near Paris. In proximity to the railway line some telegraph lines were recently erected on columns fitted with ordinary insulators. The workmen occupied on the section experienced severe shocks when they touched the wires. Experiments were made to discover the cause and it was found that the currents were produced by Hertzian waves originating from the wireless telegraph station at the Eiffel Tower.

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THE MARCONIGRAPH

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No manuscripts will be returned unless return postage is enclosed.

Vol. I. OCTOBER No. 1

Editorial

With the first number of THE MARCONIGRAPH we desire to set forth some of our reasons for placing this magazine before the public.

That there is a demand for a magazine of wireless telegraphy—an authoritative publication which will set forth in detail the interesting features of the rapid development of this fascinating art—is clearly indicated by the fact that nearly a quarter of a million people in the United States alone are keenly interested in this subject. Some because they have invested in wireless securities, and others because they are engaged in wireless experimentation. The shareholders are naturally anxious to be kept posted in regard to their holdings; to learn the details of the eventful wireless occurrences of which the newspapers can only give meagre reports; and to be enlightened as to the commercial influence of patent infringements and decisions. The amateur and experimenter has for some time been seeking authoritative information to guide his experiments. He should be interested in knowing what Marconi and his vast array of experts are doing; to have their advice on his particular experiments, and to have them solve his problems. Rapid strides are being made in the development of radio-telegraphy, new apparatus is being experimented with, new instruments invented. The details of these should certainly be of great interest to those engaged in solving the mysteries of wireless communication.

It is the purpose of THE MARCONIGRAPH to give the desired information to both.

Each month our pages will contain comprehensive articles on all the important wireless events throughout the world. These articles will be written in an entertaining style and illustrated by drawings or actual photographs wherever possible.

THE MARCONIGRAPH, sponsored by the only wireless company of commercial importance in America, is peculiarly fitted to give this information accurately and in full detail.

One of the important considerations that led us to make our bow to the public is the fact that in London an English edition of THE MARCONIGRAPH has been published for more than a year. Starting with the first issue, each month's edition has been quickly exhausted, proving that the British public want THE MARCONIGRAPH. Besides, a large circulation was gained among residents of the United States. This leads us to believe that Americans, too, want it, and that they will welcome a magazine covering wireless telegraphy from an American viewpoint. Other periodicals, noting the public demand for information on the subject, have also aimed to report wireless happenings.

THE MARCONIGRAPH enters the field as an authority both for the investor and experimenter. We aim to publish a magazine that will be at once the most complete, interesting, and practical semi-technical magazine published. There will be many interesting permanent features in addition to the reports of current events.

As a final word we wish to say that

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all our efforts will be directed toward furthering the interests of each individual interested in the art which the greatest living scientists have unanimously awarded the first place among the seven modern wonders of the world, and to assist the expansion of wireless telegraphy until it occupies a place such as is now held by the wire telegraph and telephone.

Work of Wireless

It is said that since the beginning of 1909—that is, during a period of three years—the passengers on no fewer than twenty-two shipwrecked vessels have owed their lives to the fact that the ships were equipped with a wireless telegraph system and were consequently able to send out messages for assistance.

The Share Market

NEW YORK, September 27th.

The brokers report that there is an active demand for Marconi stocks and a good trading market. Bid and asked prices to-day:

American, 8⅛—8⅜; Canadian, 5¼—5¾; English, common, 24—28; English, pfd., 22½—26.

Receivers for Wireless Co.

With the appointment of receivers for the National Electric Signaling Company, of Camden, N. J., the Marconi Company is left alone in the field, so far as the business of transmitting wireless messages in this country is concerned.

The receivers appointed for the corporation by Judge Joseph Cross, of the United States District Court for the District of New Jersey are Samuel M. Kintner, of Pittsburgh and Halsey M. Barrett, of Bloomfield, N. J.

The National Electric Signaling Company was founded in 1902, following the announcement of the Marconi discoveries, and was capitalized at $100,000. J. C. Baird is president and T. H. Given, vice-president. Hay Walker, Jr., of Pittsburgh, is the company's principal backer.

Norway-New York Service

Another advance in the scheme of establishing a Marconi wireless system to encircle the entire civilized world is the signing, a few weeks ago, of a contract with the Norwegian Government for the erection of high-power stations in Norway and in the vicinity of New York for the purpose of conducting a commercial telegraph service between Northern Europe and the United States.

According to the terms of the agreement entered into the receipts of the two stations are to be pooled between the Norwegian Government and the American Marconi Company. The Norwegian Government is to pay the Marconi Company $350,000 for the Norwegian station, exclusive of the site and foundations of the buildings, and 10 per cent. of the gross receipts for a period of twenty-five years, at the end of which time the Norwegian Government is to have the right to renew the agreement.

The Norwegian station will be the central station for the whole of Scandinavia, Russia, and perhaps some other countries. The northern countries would then establish local stations, sending and receiving wireless messages from America through the Norwegian station, which will probably be situated at Bergen and will communicate direct with the large new station near New York.

The wireless stations in Norway and American will constitute the world's longest link, being 3,750 miles apart.

The closing of this contract is one result of the negotiations being conducted by Marconi's Wireless Telegraph Co., Ltd., with several European governments. The English company acted for the Marconi Wireless Telegraph Company of America in the deal as circumstances arose which brought the Norwegian Government to a point where it was deemed advisable to define their programme immediately, enter into a contract, and announce it.

The awarding of this contract to the Marconi Company is significant of the universal recognition of Marconi efficiency.

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The Pacific Coast Situation

Two sites for stations in the vicinity of San Francisco have been secured by the Marconi Wireless Telegraph Company of America. The stations will be operated simultaneously or in duplex.

A high-power sending station will be erected on the 1,100 acre Marshall site and upon the Belonias site, comprising 650 acres, the receiving station will be located.

At both transmitting and receiving stations will be twelve steel towers 350 feet high in addition to operating houses and power generating plants. When completed the San Francisco stations will communicate direct with a station to be erected at Manila, carrying messages almost 7,000 miles.

Land has also been acquired for two similar wireless stations at Honolulu and structural work has already begun on the island stations.

When the San Francisco and Honolulu stations are completed there will be constant communication by wireless between these two widely separated points night and day.

The Honolulu station is the connecting link in the Marconi wireless globe girdling scheme. Messages will then be possible from San Francisco to Honolulu, to Manila, Singapore and Bangalore, to Aden, thence through Egypt to London and New York.

* * * *

Reports from Seattle, Wash., state that the recently installed Marconi station at that point is now in continuous operation and the 3 kilowatt equipment is working with San Francisco every night. The operator has been in communication with the station at Olongapa in the Philippines and the S. S. *Wilhelmina,* when about 200 miles out of Honolulu. The station had been in operation but a few days when the Signal Corps cable which handles most of the Alaska business, encountered trouble and the business was turned over to and successfully handled by the Marconi station.

This new station at Seattle will no doubt become the best ship station on the Pacific Coast as soon as the 30-kilowatt installation which has been shipped from South Wellfleet is substituted for the 3-kilowatt set now in use. The tower which is 350 feet high, was erected by the Commercial Wireless Telegraph Company at a cost of many thousands of dollars. This concern never installed apparatus, as it went into the hands of a receiver shortly after its organization. The tower and station buildings were recently purchased from the receiver by the American Marconi Company at a cost of a few hundred dollars.

After the new 30-kilowatt apparatus has been installed, it is proposed to start a night press service between Seattle and Honolulu.

As to Marconi Monopoly

From London comes word that the sub-committee on wireless telegraphy, appointed by the Board of Trade, to deal with the question of monopoly in wireless installations, has issued its report. It says the Marconi Company's claim to what amounts to a monopoly in that country regarding certain patents is disputed by Siemens Brothers and the Hilsby Company, but both these companies are desirous of obtaining from the Marconi Company a license to use the Lodge patent. The sub-committee adds:

"We can express no opinion on the matters in dispute, but we have arrived at the conclusion that any British shipowner dealing with the Marconi Company's competitors will do so at the risk of costly litigation, and, further, that as matters stand at present any effective competition with the Marconi Company in the supply of installations may be impracticable."

Col. C. C. Wilson Dies in Prison

Christopher Columbus Wilson, of New York, former president of the United Wireless Telegraph Company, who was serving a three-year term in the Federal Prison at Atlanta, Ga., for using the mails in attempt to defraud, died suddenly during the night of August 26. Uraemic poisoning was given as the cause of death.

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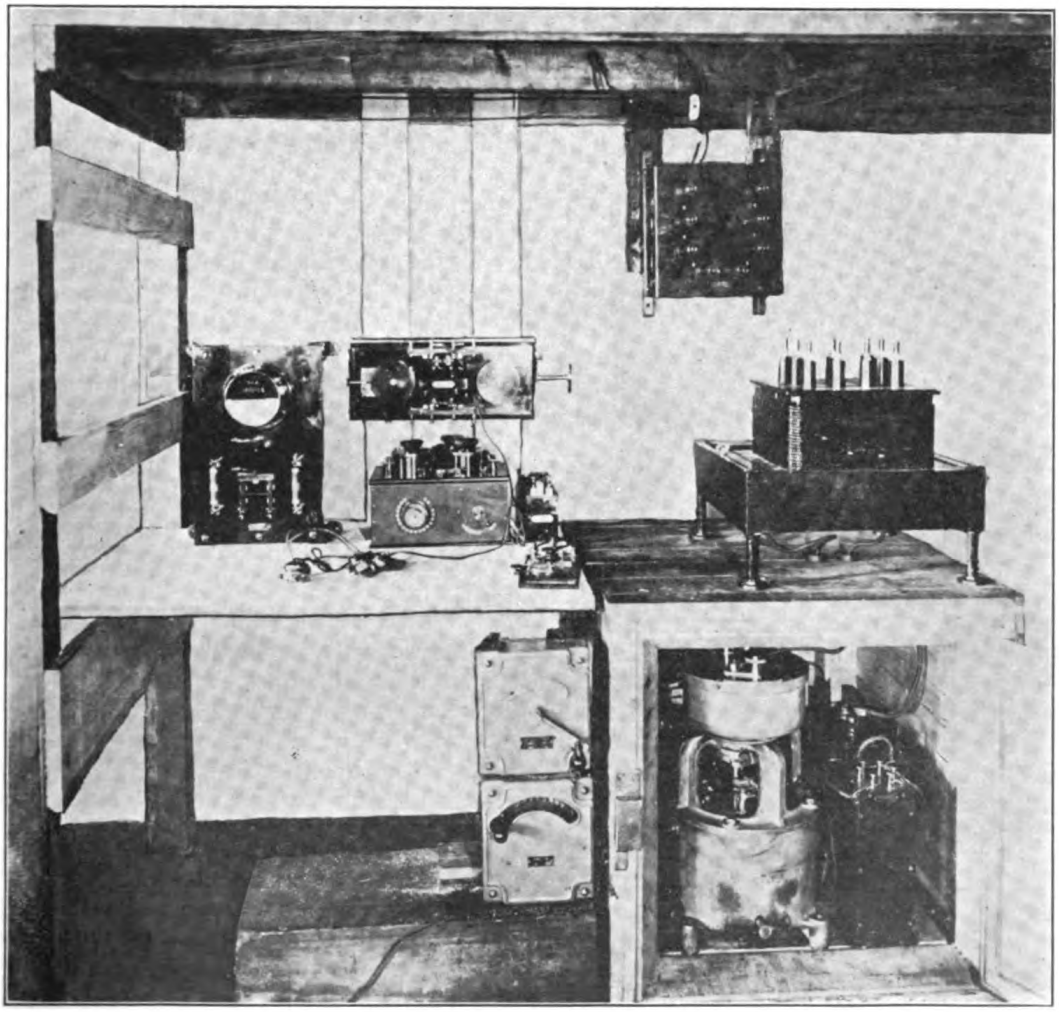
New Apparatus for Cargo Vessels

The ½ kw. Marine Set Which is Finding Favor Among Owners of Ships for Which the Standard Equipment Would be too Large

THE increased efficiency of wireless telegraphy has been so thoroughly demonstrated within the past few months that no longer do shipping interests look entirely at its humanitarian value, but are giving close attention to its application to general purposes. Not only has wireless telegraphy been instrumental in saving numbers of lives; perishable cargoes have from time to time been spared and considerable time and expense saved through the diverting of vessels from one port to another.

The recent labor troubles in England clearly demonstrated the usefulness of wireless to all classes and sizes of vessels. Vessels scheduled to discharge at Liverpool were held up at a considerable loss to their owners.



Cargo set complete.

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Could the captains of these vessels have been instructed by wireless as they approached and proceeded to another port a great saving in time and money would have been accomplished.

Aside from this, the great commercial advantages of equipping cargo boats with wireless are daily becoming more apparent. Take, for example, the case of a vessel carrying a

½ kw. converter with disc discharger.

cargo of wheat. It often happens that the cargo changes hands several times between the departure of the vessel from the United States and its arrival at the port of destination in another country. Many times unforeseen circumstances arise and it might be better for the vessel to put in at another port; but an alteration in the course is only possible where the owners are enabled to communicate by wireless with the commander. Then there are the innumerable cases where either property or life, or both, lost at sea might have been saved had the vessels which met with disaster been equipped with wireless apparatus.

Not so long ago a new ship left the builders' hands at Glasgow; she was considered a triumph of cargo ship building, fitted with every up-to-date appliance—excepting wireless. The vessel never passed Gibraltar. It is presumed she foundered somewhere in the Bay of Biscay, certainly within range of some of the numerous land or ship stations in the vicinity. The survivors of another vessel which was burnt at sea would have been spared the terrible sufferings they were forced to endure for many days and the vessel saved had it been possible to summon assistance during the early part of the conflagration. Another vessel lost her propeller in the Atlantic and drifted about for twenty days, when she had to be abandoned. A French steamer was sighted during that period, but being a mail carrying ship, she was unable to tow the helpless vessel to port. It has since been established that there were many other ships in the vicinity which would have been willing and able to tow her to port, but not having a wireless equipment the vessel could not get into communication with them.

These are only a few examples of cases where cargo vessels which have come to grief on the open sea might have been saved had they been equipped with wireless apparatus. Many others might be cited, and many more are known to ship owners.

Whether it was these occurrences or whether the new law requiring ships carrying fifty persons, passengers and crew, to carry full equipment brought to the attention of owners of small cargo vessels the desirability of having their ships equipped with efficient wireless apparatus cannot be definitely determined, but many new installations are reported among the smaller cargo vessels.

The excuse for not equipping cargo boats earlier has been the absence of

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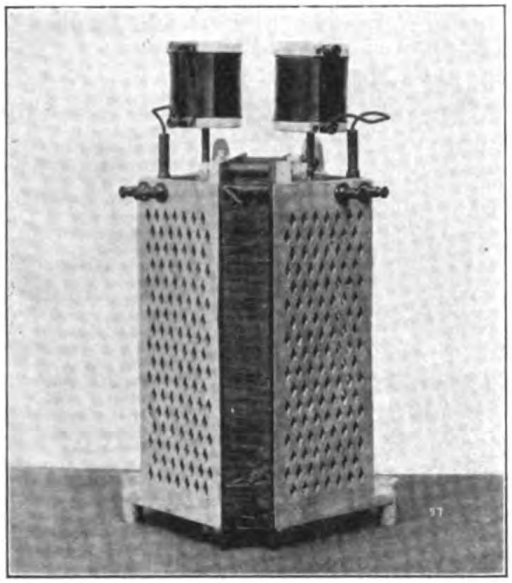


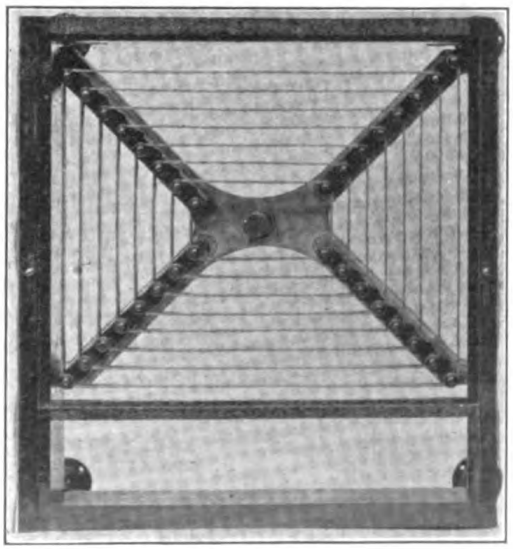
The transformer with choke coils mounted on top.

a sufficiently small, compact and efficient set suitable in cases where the standard ship equipments are too large. To meet these requirements and in view of the likelihood of the Governments of the world insisting that vessels sailing under their flags or entering their ports be equipped with wireless, a Marconi ½ kw. set has been evolved which is specially adapted to the requirements of cargo vessels.

The apparatus referred to is known as the Marconi ½-kw. cargo set. This is a small power installation designed to produce transmitting waves of 250 and 600 meters, or any intermediate wave with a simple change-over from one to any other. The working transmitting range depends upon the height, length and shape of the aerial. The receiving apparatus provides for tuned reception of all waves between 250 and 1,600 meters. The working receiving range is also dependent on the aerial.

The transmitting plant consists of a rotary converter with its starter, field regulator, and guard lamps driven by direct current from the ship's mains and supplying alternating current to the primary of the potential transformer. In series with the primary of this transformer is inserted the low frequency air core, adjustable inductance and the manipulating key. The secondary coil of the potential transformer is connected through two air core choking coils with the primary high frequency circuit. The primary coil of the oscillation transformer is connected in series with the transmitting condenser and disc discharger, one end of the primary coil being connected to one terminal of the condenser and the other to one of the electrodes of the disc discharger. The secondary of the oscillation transformer is connected at one end to an aerial, through an adjustable inductance, and an insulated lead in, passing through the roof or side of the operating cabin. The other end of the secondary connects to the top plate of an arrester earth spark-gap, the bottom plate of the spark-gap being connected to the earth bolts which are fastened to the plates of the iron shell of the ship. The receiving apparatus is connected across the arrester earth spark-gap, an arrangement which enables the receiving operator at a corresponding station to "break in" on the transmission in the event of erroneous reception, and thus avoid waste of time.

The rotary converter gives an alternating current output of ½ kw. It is



Primary transmitting jigger, showing bare strip winding.

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of the vertical type, and occupies a minimum of floor space. The armature is of a special design, and differs from the ordinary converter by giving at the slip rings a constant alternating current voltage independent of the direct current imput voltage. The machine is designed to suit the direct supply available on the ship. It has eight poles, and runs at 2,250 revolutions per minute, thus giving a spark frequency of 300 per second.

The discharger box is made of aluminium, and is fitted on top of the converter, and contains an eight-stud disc, which is carried on the armature shaft by an insulating bush. The top of the box is made of ebonite, and carries the two electrodes. These electrodes are designed to be independently adjusted, and both electrodes can be moved so as to regulate the time of the spark discharge in relation to the alternator. A scale of 180 degrees is fixed on top of the box discharger. The phase displacement is shown by an index mark on the ebonite disc carrying the electrodes. When this index mark is at 0 deg. on the scale, the discharge will take place at the moment of maximum volts on the alternator; at 10 deg. lag. the discharge will take place at 10 deg. after the alternator has reached its maximum voltage; and so on. A small fan is fitted on the shaft at the bottom of the box discharger, and this carries away the gases formed by the discharge. The switchboard consists of a black enamelled slate mounted on a cast-iron frame and fitted with an ammeter of the spring controlled type, a double-pull switch, and two single-pull fuses, and is inserted between the alternating current side of the converter and the primary of the potential transformer.

The low frequency primary inductance consists of several layers of No. 14 D.C.C. copper wire wound on an ebonite tube. Tappings are made at various points, and connections made to the terminals mounted on the top of the box. The function of the low frequency primary inductance is to regulate the power and assist in tuning the circuit.

The low frequency potential transformer consists of a primary and secondary mounted on a closed laminated iron core, the complete transformer being enclosed in an aluminium frame. Being of the vertical type, it requires a very small amount of floor space. The ratio is about 95 to 1. The high frequency and air-core chokes consist of a number of turns of enamelled wire wound on porcelain bobbins and mounted on top of the potential transformer. They are inserted in the high tension circuit to prevent any rush of high frequency current into the transformer secondary.

The variable coupling oscillation transformer is of the air-core type, a sheet of ebonite 1/8 inch thick separating the primary coil from the secondary. The primary consists of about seven turns of copper strip mounted on ebonite; the secondary consists of twenty turns of stranded copper wire wound on a wooden former about 12 inches square. This secondary coil slides over the primary coil, and by this means a coupling between the wave-generating and the wave-radiating circuit is varied. Connection to the primary is made by means of easily detachable spring clips, which provide a ready method of altering the wave-length. The transmitting condenser consists of 34 glass plates interspaced with 17 zinc sheets, the whole supported in a galvanized iron cradle. The alternate zinc sheets are connected together, thus forming two sections. Each section is connected to an insulated terminal on top of the teak, lead-lined container.

The two protecting lamps supplied are of the single straight filament carbon type suitable for the voltage of the converter, and mounted between spring clips on a board. One lamp is connected as a shunt to the armature, and the other to the field of the converter. These lamps protect the converter from the injurious effects of any high frequency currents which may be generated in the primary circuit by providing an alternative non-inductive path for them across the machine. The manipulating key

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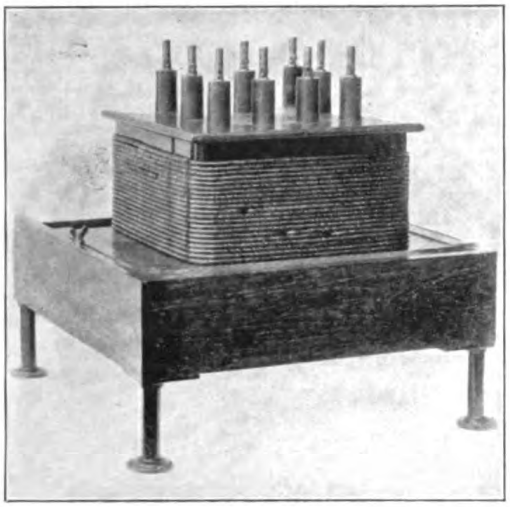

Transmitting jigger complete.

is designed for fast sending, and is fitted with a side lever, which provides a ready method at the hand of the operator for breaking the primary circuit in an emergency. There are three terminals, which have their connections marked on them. In addition, there are two other terminals, which connect to the telephone terminals of the magnetic detector. These are mounted on the end of two insulated spring clips carrying contacts. The contacts touch when the key is depressed, and so short-circuit the telephone and prevent it responding to impulses from the transmitting plant. The receiving circuit is always connected to the aerial, so that when the key is up signals can at once be received, and the operator interrupted in the middle of the message if necessary. The front and back upper contacts of the key and the upper telephone short circuiting contact are adjustable. The transmitting gear, with the exception of the oscillating transformer, the starter, the regulator, and manipulating key, are enclosed in a sound-proof cabinet. The complete transmitting apparatus is mounted on a wooden base, which slides into the cabinet and provides an easy and efficient means for inspection and repairs.

Marconi in an Accident

As we go to press, a dispatch from Rome states that there is apparently no longer any danger of Mr. Marconi losing the sight of his eye, as was rumored would result from the injuries received in an automobile accident in the Italian Riviera.

While reports that the inventor's condition was much worse were unfounded, it is now ascertained that Mr. Marconi's eye was injured by a splinter of broken glass, which pierced the eyeball. The doctors believe that the injury will not affect his sight.

The accident happened on September 25. Mr. Marconi, accompanied by his wife, secretary, and chauffeur, was traveling from Spezia to Genoa, when, at a sharp corner, a collision occurred with an automobile coming from Genoa, carrying six Venetian ladies. The two cars were overturned.

All the Venetian ladies were injured. Mr. Marconi, notwithstanding a severe wound in his right eye, which later became much swollen, went to the rescue of his wife and the others, rejecting aid himself until all the rest had received assistance. Mrs. Marconi was unhurt, and the secretary and the chauffeur were only slightly injured.

A report of the accident was immediately telegraphed to King Victor Emmanuel, who was one of the first to send inquiries regarding the famous inventor's condition.

To Calm Air Waves

Experts from the signal corps of the State National Guard will try out a new device for calming the air waves in the immediate vicinity of a flying aeroplane by means of wireless transmission of electricity. The theory is that the wireless currents will control the air currents in much the same way as oil poured on a storm tossed sea stills the troubled waters.

At present little is known as to the actual time required for a message to travel on the ethereal waves, but as soon as the new wireless station at Arlington, Va., is completed scientists propose to find out.

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AMATEUR CLUB NEWS

In this department the affairs of the various wireless clubs and associations will receive attention. Believing that all amateurs are interested in the experiments and research work of others the publishers plan to give readers each month distinctive items on the progress made by club members, thus offering all an exchange of ideas in organization and experimental matters and bringing students in closer touch with each other. To this end we will also publish a Wireless Club Directory. The names of the officers and the street address of the secretary are requested from all clubs. Notification of any changes should be forwarded at once. Short descriptive articles of experiments or new stations with distinctive features, accompanied by drawings or photographs, will be published.

The Wireless Association of Savannah is one of the recently organized clubs which, judging from the progressive spirit exhibited by its members, should soon become an institution of great value and influence among the amateur operators in the State of Georgia. Every Friday night the club holds a meeting, during which the discussion of various wireless subjects is taken up by those members best informed in various branches of wireless telegraphy and telephony. Each member has his own sending and receiving station, some of which are capable of copying messages from 800 to 1,000 miles. Philip C. Bangs is president; Arthur A. Funk, vice-president; Lewis H. Cole, secretary, and Hugh Jenkins, treasurer; under their able supervision the club has maintained a heavy attendance and is steadily increasing its membership. The main purpose of the club is to bring the amateurs of Savannah in closer touch with each other and to secure the co-operation of all those interested in the art of wireless communication residing in the State of Geor-

A Wireless Club demonstrating at a Business Men's Exposition.

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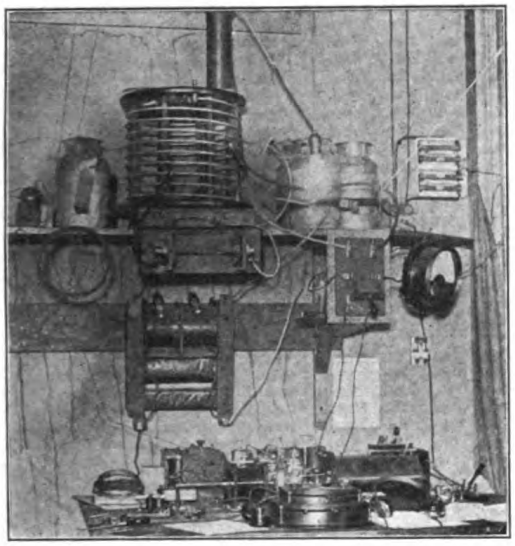
gia, to the end of rapidly developing an organization of especial value to the wireless experimenter no matter in what part of the country he may be located. Correspondence should be addressed to L. H. Cole, 303 Prince street, Savannah, Ga.

At Denver, Colo., the Colorado Wireless Association has just entered the field for the purpose of propagating



Farthest North amateur station; Nome, Alaska.

amateur experimenting in Denver and the State of Colorado. At the helm is William Cawley, president; Thomas Ekrem is vice-president; W. F. Lapham, of 1545 Milwaukee street, Denver, is secretary and treasurer. Any person interested in this organization is requested to communicate with the latter officer.

One of the most instructive boys' clubs in the world is the Y. M. C. A. Wireless Club, of Williamsport, Pa., organized last winter. Healthy enthusiasm on the part of the energetic, ambitious few who made up the charter membership has brought the club roster to the point where it holds the names of twenty-two members. On meeting nights the more experienced experimenters take up scientific problems and their solution, using both text books and blackboard diagrams to make their meaning clear. The able officers are: Lewis Holtzinger, president; Christian Coup, vice-president; Robert Templeman, treasurer and Lester Lighton, to whom all correspondence should be addressed, secretary. The headquarters of the organization are in the Y. M. C. A. Building, 211 West Fourth street, Williamsport, Pa.

All those residing in the State of New Jersey who are interested in wireless communication are cordially invited to write to Charles E. Rakestran, Jr., secretary and chief operator of the Wildwood Wireless Association of that State. His address is 110 East Pine avenue, Wildwood, N. J. At the present time the organization holds its meetings at the Hotel Beachwood, presided over by Russell Kurtz, president. The other officers are Walter Nefferdorf, vice-president and J. Crozier Todd, treasurer.

A Southern amateur at home.

Wireless Club Directory

Amateur wireless clubs and associations are requested to keep us posted in regard to any changes that should be made. New Clubs will be entered in the issue following receipt of notices in the form given below.

ARKANSAS

LITTLE ROCK—Arkansas Wireless association: G. A. Rauch, president; Edward Vaughn, 2622 State St., Little Rock, Ark., secretary and treasurer.

BRITISH COLUMBIA

VANCOUVER—Wireless Association of British Columbia: Clifford C. Watson, president; J. Arnott, vice-president; E. Kelly, treasurer; H. C. Bothel, 300 Fourteenth Ave., E. Vancouver, B. C., secretary.

CALIFORNIA

LONG BEACH—Long Beach Radio Research Club: Bernard Williams, 555 E. Seaside Blvd., Long Beach, Cal., secretary.

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LOS ANGELES — Custer Wireless Club: Franklin Webber, president; Oakley Ashton, treasurer; Walter Maynes, 438 Custer Ave., Los Angeles, Cal., secretary.

NAPA—Aero Wireless Club: A. Garland, president; W. Ladley, vice-president; D. Beard, Napa, Cal., secretary and treasurer.

OAKLAND — Fruitvale Wireless Club: Joseph C. Brewer, president; Alan Downing, vice-president; Chrissie Eiferle, treasurer; Abner Scoville, 2510 Fruitvale Ave., Oakland, Cal., secretary.

OAKLAND — Oakland Wireless Club: H. Montag, president; W. L. Walker, treasurer; W. R. Sibbert, 916 Chester St., Oakland, Cal., secretary.

SACRAMENTO — Sacramento Wireless Signal Club: E. Rackliff, president; J. Murray, vice-president; G. Banvard, treasurer; W. E. Totten, 1524 "M" St., Sacramento, Cal., secretary.

SANTA CRUZ — Santa Cruz Wireless Association: Orville Johnson, president; Harold E. Sentor, 184 Walnut St., Santa Cruz, secretary and treasurer.

CANADA

PETERBORO, Ontario — Peterboro Wireless Club: G. B. Powell, president; C. V. Miller, vice-president; E. W. Oke, 263 Engleburn Ave., Peterboro, Ontario, Can., secretary and treasurer.

WINNIPEG, Manitoba—Canadian Central Wireless Club: Alexander Polson, president; Stuart Scorer, vice-president; Benj. Lazarus, P. O. Box 1115, Winnipeg, Manitoba, Can., secretary and treasurer.

COLORADO

DENVER—Colorado Wireless Association: William Cawley, president; Thomas Ekren, vice-president; W. F. Lapham, 1545 Milwaukee St., Denver, Colo., secretary and treasurer.

CONNECTICUT

NEW HAVEN—New Haven Wireless Association: Roy E. Wilmot, president; Arthur P. Seeley, vice-president; Russel O'Connor, 27 Vernon St., New Haven, Conn., secretary and treasurer.

WATERBURY — Waterbury Wireless Association: Weston Jenks, president; Alfred Upham, treasurer; H. M. Rogers, Jr., 25 Linden St., Waterbury, Conn., secretary.

GEORGIA

SAVANNAH — Wireless Association of Savannah: Philip C. Bangs, president; Arthur A. Funk, vice-president; Hugh Jenkins, treasurer; Lewis Cole, 303 Price St., Savannah, Ga., secretary.

ILLINOIS

CHICAGO — Chicago Wireless Association: John Walters, Jr., president; E. J. Stein, vice-president; C. Stone, treasurer; F. D. Northland, secretary; R. P. Bradley, 4418 South Wabash Ave., Chicago, Ill., corresponding secretary.

CHICAGO — Lake View Wireless Club: E. M. Fickett, president; R. Ludwig, treasurer; R. F. Becker, 1439 Winona Ave., Chicago, Ill., secretary.

CHICAGO — Northwestern Wireless Association of Chicago: Rolf Rolfson, president; H. Kunde, treasurer; Edw. G. Egloff, 2720 Noble Ave., Chicago, Ill., secretary.

DE KALB—De Kalb Radio Transmission Association: Bruce Lundberg, president; Walter Bergendorf, vice-president; De Estin Snow, treasurer; Bayard Clark, 205 Augusta Ave., De Kalb, Ill., secretary.

INDIANA

FAIRMOUNT—Southeastern Indiana Wireless Association: R. F. Vanter, president; D. C. Cox, vice-president and treasurer; H. Hitz, Fairmont, Madison, Ind., corresponding secretary.

HOBART—Hobart Wireless Association: Asa Bullock, president; Charles Clifford, Hobart, Ind., secretary.

INDIANAPOLIS — Wireless Club of the Shortridge High School: Robert C. Schimmel, 2220 N. Penn St., Indianapolis, Ind., president; George R. Popp, vice-president; Bayard Brill, treasurer; Oliver Hamilton, secretary.

RICHMOND—Aerograph Club of Richmond, Ind.; H. J. Trueblood, president; Richard Gatzek, vice-president; James Pardieck, 320 South Eighth St., Richmond, Ind., secretary.

VALPARAISO—Alpha Wireless Association: L. L. Martin, president; F. A. Schaeffer, vice-president; G. F. Girton, Box 57, Valparaiso, Ind., secretary and treasurer.

KANSAS

INDEPENDENCE — Independence Wireless Association: Boyce Miller, president; Ralph Elliott, secretary; Joseh Mahan, 214 South Sixth St., Independence Kan., vice-president.

LOUISIANA

NEW ORLEANS — Southern Wireless Association: B. Oppenheim, president; P. Gernsbacher, 1435 Henry Clay Ave., New Orleans, La., secretary.

MARYLAND

BALTIMORE—Wireless Club of Baltimore: Harry Richards, president; William Pules, vice-president; Curtis Garret, treasurer; Winters Jones, 728 North Monroe St., Baltimore, Md., secretary.

MASSACHUSETTS

ADAMS — Berkshire Wireless Club: Warren A. Ford, president; William Yarkee, vice-president; Charles Hodecker, treasurer; Jas. H. Ferguson, 18 Dean St., Adams, Mass., secretary.

HAVERHILL — Haverhill Wireless Association; Riedel G. Sprague, president; Charles Farrington, vice-president; Leon R. Westbrook, Haverhill, Mass., secretary and treasurer.

ROSLINDALE—Roslindale Wireless Association: O. Gilus, president; E. T. McKay, Treasurer; Fred C. Fruth, 962 South St., Roslindale, Mass., secretary.

SOMERVILLE — Spring Hill Wireless Association: R. D. Thiery, president; H. P. Hood, Second and Benton Road, Somerville, Mass., secretary and treasurer.

SPRINGFIELD—Forest Park School Wireless Club: W. S. Robinson, Jr., president; William Crawford, R. F. D. No. 1, Springfield, Mass., secretary.

SPRINGFIELD — Springfield Wireless Association: A. C. Gravel, president; C. K. Seely, vice-president; D. W. Martenson, secretary. Club Rooms, 323 King St., Springfield, Mass.

WEST MEDFORD—Independent Wireless Transmission Co., Starr W. Stanyan, 76 Boston Ave., West Medford, Mass., secretary.

MICHIGAN

JONESVILLE — Jonesville Wireless Association: Frederic Wetmore, president; Webb Virmylia, vice-president; Richard Hawkins, treasurer; Merritt Green, Lock Box 82, Jonesville, Mich., secretary.

MINNESOTA

ST. PAUL—St. Paul Wireless Club: Thos. Taylor, president; L. R. Moore, vice-president; E. C. Estes, treasurer; R. H. Milton, 217 Dayton Ave., St. Paul, Minn., secretary.

MISSOURI

HANNIBAL — Hannibal Amateur Wireless Club: Charles A. Cruickshank, president; J. C. Rowland, vice-president; William Youse, treasurer; G. G. Owens, 1306 Hill St., Hannibal, Mo., secretary.

MONTANA

BUTTE—Wireless Association of Montana: Roy Tusel, president; Elliot Gillie, vice-president; Harold Satter, 309 South Ohio St., Butte, Mont., secretary.

NEW HAMPSHIRE

MANCHESTER — Manchester Radio Club: Homer B. Lincoln, president; Clarence Campbell, vice-president; Elmer Cutts, treasurer; Earle Freeman, 759 Pine St., Manchester, N. H., secretary.

NEW JERSEY

WILDWOOD—Wildwood Wireless Association: Russell Kurtz, president; Walter Nefferdorf, vice-president; J. Crozier Todd, treasurer; Chas. E. Rockstraw, Jr., 110 East Pine Ave., Wildwood, N. J., secretary.

NEW YORK

BUFFALO — Frontier Wireless Club: Chas. B. Coxhead, president; John D. Camp, vice-president; Franklin J. Kidd, Jr., treasurer; Herbert M. Graves, 458 Potomac Ave., Buffalo, N. Y., secretary.

GENEVA—Amateur Wireless Club of Geneva: H. B. Graves, Jr., president; C. Hartman, vice-president; L. Reid, treasurer; Benj. Merry, 148 William St., Geneva, N. Y., secretary.

GENEVA — Geneva Wireless Club: Charles B. Hartman, president; Charles Smith, vice-president; Benj. Merry, treasurer; Henry B. Graves, Jr., 448 Castle Ave., Geneva, N. Y., secretary.

MT. VERNON—Chester Hill Wireless Club: Waller Morgan, president; Richard D. Zucker, 46 Clinton Place, Mt. Vernon, N. Y., secretary.

NEW YORK — Gramercy Wireless Club: James Platt, President; John Gebhard, vice-president; John Diehl, treasurer; John Jordan, 219 East 23d St., New York, secretary.

NEW YORK—Plaza Wireless Club: Paul Elliot, president; Myron Hanover, 156 East 66th St., New York, secretary and treasurer.

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NYACK — Rockland County Wireless Association: W. F. Crosby, president; Marquis Bryant, secretary; Erskine Van Houten, 24 De Pew Ave., Nyack, N. Y., corresponding secretary.

SCHENECTADY — Amateur Wireless Association of Schenectady: D. F. Crawford, president; L. Beebe, vice-president; C. Wright, treasurer; L. S. Uphoff, 122 Ave. "B," Schenectady, N. Y., secretary.

NORTH DAKOTA

FARGO — Fargo Wireless Association: Kenneth Hance, president; John Bathrick, vice-president; Earl C. Reineke, 518 Ninth St., Fargo, N. D., Secretary.

OKLAHOMA

MUSKOGEE—Oklahoma State Wireless Association: T. E. Reid, president; G. O. Sutton, vice-president; Ralph Johns, Box 1448, Muskogee, Okla., secretary.

OREGON

LENTS — Oregon State Wireless Association: Charles Austin, president; Joyce Kelly, recording secretary; Edward Murray, sergeant-at-arms; Clarence Bischoff, Lents, Ore., treasurer and corresponding secretary.

PENNSYLVANIA

LEETSDALE — Allegheny County Wireless Association: Arthur O. Davis, president; Theodore D. Richards, vice-president: James Seaman, Leetsdale, Pa., secretary and treasurer.

PITTSBURG—Greenfield Wireless Association: Edward M. Wolf, president and corresponding secretary, 4125 Haldane St., Pittsburg, Pa.

WILLIAMSPORT — Y. M. C. A. Wireless Club: Lewis Holtzinger, president; Christian Coup, vice-president; Robert Templeman, treasurer; Lester Lighton, 211 West Fourth St., Williamsport, Pa., secretary.

RHODE ISLAND

NEWPORT — Aerogram Club: J. Stedman, president; A. Hayward Carr, chairman Board of Directors; Albert S. Hayward, treasurer; Donald P. Thurston, secretary; Walter B. Clarke, 17 May St., Newport, R. I., corresponding secretary.

TENNESSEE

MEMPHIS—Tri-State Wireless Association: C. B. De La Hunt, president; O. F. Lyons, vice-president; T. J. Daly, treasurer; C. J. Cowan, Memphis, Tenn., secretary.

WISCONSIN

MILWAUKEE—Cardinal Wireless Club: K. Walthers, president; F. Dannenfelser, vice-president; Miss A. Peterson, South Division High School, Milwaukee, Wis., secretary.

A Test Buzzer Substitute

BY F. L. BAILEY, U. S. S. *Virginia.*

If there is a live wire, either direct or alternating, near your wireless set, a simple yet effective testing device may be made in the following manner: Take a piece of magnet wire of any convenient size and fasten one end of it either direct to the binding post of your receiving primary, or connect it to a coil of a few turns near the primary, and then join the other end to a coil of about a dozen turns located near the current wire. The key or a common switch, is then placed in the line between the two coils. On closing the key a clear buzz may be heard in the 'phones provided there is a good point on the detector. The advantage of using the key in place of the switch is that the device forms a very small practice buzzer. The strength of the signals may be varied by increasing or decreasing the number of turns in the coil near the wire, or by changing the distance between the coil and wire, but great care should be used not to short circuit or ground the latter.

Queries Answered

Answers will be given in this department to questions of subscribers, covering the full range of wireless subjects, but only those which relate to the technical phases of the art and which are of general interest to readers will be published here. The subscriber's name and address must be given in all letters and only one side of the paper written on; where diagrams are necessary they must be on a separate sheet and drawn with india ink. Not more than five questions of an individual can be answered. To receive attention these rules must be rigidly observed.

H. L. D., Darlington, Pa., asks: (1) Would iron tubing clamped to the top of a tree be satisfactory as an aerial?

(2) Would a 20-foot mast on a hill 1,300 feet above sea level be better as an aerial support than one 60 feet high in a valley 100 feet below sea level?

(3) Is a slanting aerial more satisfactory than one of the horizontal type?

(4) Are batteries used to any extent in commercial stations at the present time?

(5) How much No. 18 S. C. C. magnet wire would be required for a tuning coil 3 inches in diameter and 12 inches long?

Ans.—(1) Yes.

(2) The former would give better results.

(3) We should prefer a slanting aerial for experimental purposes, as it is not so directive as the horizontal type.

(4) No; generators are used almost exclusively.

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(5) About 10 ounces.

B. T. E., Belfast, Me., asks: (1) How much No. 24 enameled wire will be required for a tuning coil to receive from stations having a wave length of 2,000 meters, in connection with an aerial 300 feet long?

(2) How many feet in a pound of No. 24 enameled wire? No. 20?

Ans.—(1) About 12 ounces. The diameter should be 2 inches and the length of the winding 15 inches.

(2) No. 24—810 feet. No. 20—320 feet.

M. S., Princeton, Ill., asks for information on the following:

(1) Is there any difference in efficiency due to difference in the method of connecting the ends of the loose coupler and the electrodes of the detector?

(2) How can I insulate an iron pipe mast from the earth so as not to lose energy through it?

(3) What is meant by "50 double turns on each leg of a transformer"?

Ans.—(1) We have never observed any difference. The received oscillations are alternating in character, and consequently have no polarity.

(2) The best plan is to set it in a concrete base made in the ground. You will not discover much loss, however, with a small station even if the mast is in close contact with the earth.

(3) This expression generally means that two different wires are wound on at a time, and the ends connected, so that the result is double the carrying capacity of one wire.

C. G., Toronto, Can., asks:

(1) Is the loop aerial better than the straightaway?

(2) Kindly give connections for an 8-wire loop aerial.

Ans.—(1) The only advantage of the loop type is that it permits slightly closer tuning, but it requires the use of an anchor gap.

(2) At the top connect the first and second together, the third and fourth, the fifth and sixth, and the seventh and eighth. At the lower end, connect the second and third, the fourth and fifth, and the sixth and seventh. The lower ends of the first and eighth wires are led into the station.

P. D., Keosaqua, Iowa, inquires:

How far can I receive with silicon detector, fixed condenser, 1,000 ohm, receiver and double slide tuning coil, core 2 inches in diameter, 12 inches long, wound with No. 20 enameled wire. My aerial is 100 feet long; 75 feet high at one end; 40 feet at the other.

Ans.—An average distance of 400 miles over level land from high power stations.

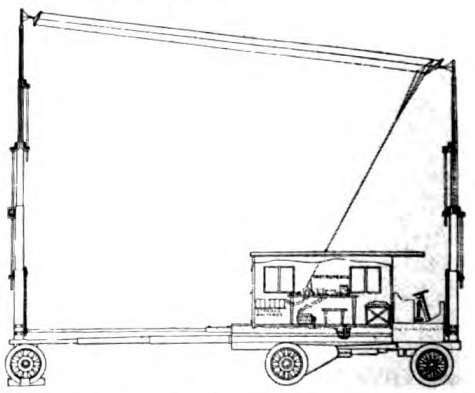
Raes Auto Wireless Station

A portable wireless station mounted on an automobile chassis is the latest invention of Joseph Raes, of Washington, who already has taken out a number of patents on various devices.

The wireless outfit is placed on an automobile chassis, at both end of which are telescoping standards which may be extended vertically and spaced the required distance apart to keep the aerial taut. The towers are automatically actuated through the medium of the motor which propels the truck.

The truck is specially constructed to provide an enclosure for the wireless apparatus and to shelter the operator while on duty.

The method of extending and contracting the towers is clearly shown in the accompanying drawing, consisting of co-operative gear and rod and chain connections operated directly from the motor of the truck.



The invention has been put before the Committee on Military Affairs in the House of Representatives.

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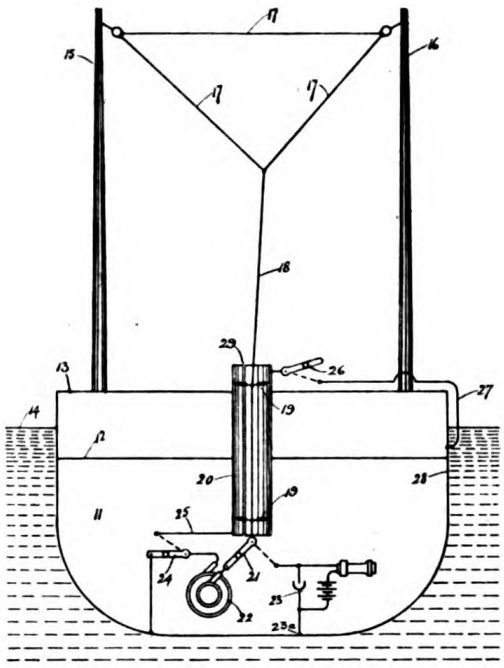
Notable Patents

Prof. Reginald A. Fessenden has obtained a patent on an invention relating to the art of transmitting energy by electrical oscillations and more paticularly to wireless telegraphy; its primary object is the more efficient transmission and receipt of energy by electrical oscillations and more paticularly the prevention of loss from absorption and shielding in transmitting and receiving signals by wireless telegraphy.

The accompanying drawing shows a sectional view illustrating the apparatus.

This invention is particularly adapted for use where it is desired to locate wireless apparatus within an inclosure having walls of iron or similar material and especially on board battleships where it is desired to locate the wireless apparatus below the protective deck. Heretofore this has been found impossible, the signals produced and received when the apparatus is placed below the protective deck on war vessels or in a similar situation on other vessels being rendered so weak as to prevent satisfactory working over any considerable distance. As the result of numerous investigations he discovered that this weakening is probably due to hysteresis or eddy-current losses set up in the steel decks or passages through which the wireless leads pass. It was determined by experiment that merely bringing a wireless lead within a few feet from a steel plate for a range of five or ten feet has a very considerable effect on weakening the signals. Numerous additional experiments disclosed that this weakening can be overcome by surrounding the leads with a tube of conducting material, integral or slotted, which tube is preferably formed of copper or silicon bronze and surrounds the antenna lead or any of the other wireless conductors where they pass through a steel wall or in proximity to a wall of steel or similar absorbing material.

In the figure 11 is a compartment



of a vessel, 12 being the protective deck and 13 an upper deck.

14 isthe water line, 15, 16 are masts for supporting the antenna, 17, 17, 17 is an antenna formed of a number of parallel wires arranged in the shape of an inverted triangle.

18 is the lead from the antenna.

22 is a high frequency dynamo and 23 is a receiver.

21 is a switch for connecting the lead 18 either to the high frequency dynamo or to the receiver.

20 is a tube of copper, for example two feet in diameter, which may be integral or slotted as shown for example at 29.

19, 19 are insulators supporting the lead 18 in the center of the tube 20.

The wireless apparatus may be grounded directly to the frame of a ship as shown at 23^a or a switch may be employed as shown at 24 by which

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the apparatus may be connected either directly to the frame of the ship or to some conductor running through the walls of the vessel, for example to the copper tube 20 by the lead 25 as shown. The copper tube 20 is also preferably arranged as shown, so that by the throwing of the switch 26 it may be connected to a copper tube 27 which runs over the outside of the vessel and is connected to the copper sheathing on the outside of the vessel as shown at 28.

Prof. Fessenden found that by the use of this invention the difficulties heretofore met with are overcome and the signals are transmitted and received with practically their full intensity. The tuning which was formerly very poor, when the apparatus was located below a steel deck, is by this invention rendered extremely sharp. As an illustration the U. S. S. *Connecticut* lying in the Brooklyn Navy Yard was able to receive signals from Brant Rock, Massachusetts, at practically undiminished strength, while at the same time entirely cutting out the disturbing signals from the station at the Brooklyn Navy Yard so that they could not be heard at all.

Emile Girardeau, of Paris, has been granted an American patent on his invention for improvement in protective apparatus for radiotelegraphic stations. The patent specification follows:

With the object of increasing the rapidity of the operation between the transmitting and receiving apparatus in radiotelegraphic stations the following method of mounting has already been employed (Fig. 1); assuming for the sake of clearness that the antenna A is excited indirectly by means of a Tesla transformer P S and is connected to earth by the intermediary of a gap C from the terminals of which the primary of the reception jigger J is branched, its secondary circuit being closed upon the detector D. In these conditions if the transmitting apparatus does not work and if the electromagnetic waves coming from an operative station excite the antenna A the gap C does not permit of the direct passage of the current then circulating between this antenna and the earth and this current being obliged to circulate in the primary of the jigger J the signals emitted from the transmitting station are recorded by the detector D. If, on the other hand, the station is rendered operative by means of the oscillating circuit containing the spark gap E and the primary P of the Tesla transformer and if the sparking distance in C is sufficiently small a spark is struck between the electrodes of this gap and short circuits the primary of the jigger at the terminals of which the tension cannot in any case exceed the value corresponding to the sparking distance in C. This distance cannot, however, be reduced beyond a certain value without setting up a permanent short circuit in C, for example, owing to a deposit produced by the passage of the spark, a deformation of the electrodes and so forth. It follows that the detector D should be relatively strong, that is to say, in general not very sensitive as it should not be injured when a tensioning of the nature of the magnitude of the

Fig. 1.

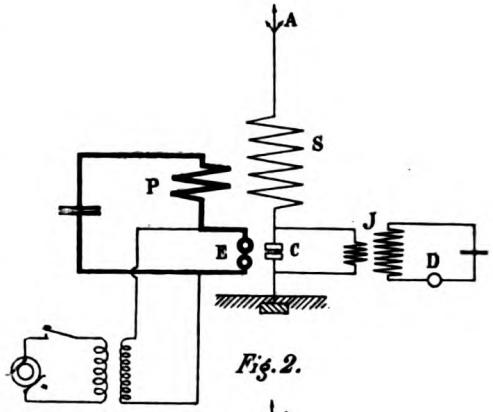
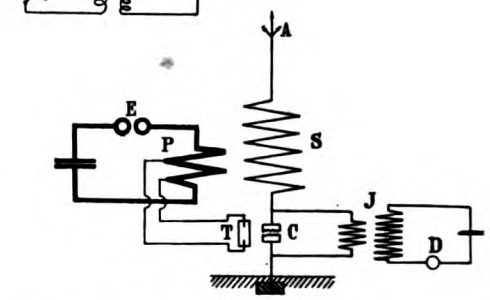


Fig. 2.



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sparking tension of the break is applied to the terminals of the primary of the jigger J. The arrangement contemplated by the invention obviates this defect and renders it possible to employ sensitive detectors.

Figs. 1 and 2 of the accompanying drawing represent two diagrams of the improved arrangement.

From the labors of H. Hertz and other experimenters it is known that the explosive potential of a spark gap is lowered considerably by the action of ultra-violet light. This ultra-violet light can be furnished by an oscillating spark, a vacuum tube and so forth. Accordingly if the break C is located (Fig. 1) in proximity to the spark gap E itself of the primary oscillating omission circuit when this gap becomes operative it automatically lowers the explosive potential in C and consequently largely reduces the strain on the detector D. Instead of utilizing the influence of the gap E directly a vacuum tube or a neon tube T (Fig. 2) can be employed for example being branched either off the extremities of a portion of the primary circuit or of the secondary circuit or even off the terminals of the gap E and so on. Obviously the illumination of this tube during the operation of the emission system produces the desired effect.

It will be obvious that numerous modifications may be devised without altering the principle of the invention; when the method of mounting illustrated in Fig. 2 is employed for example the tube T can be furnished with a tension limiting device.

An instrument for teaching telegraphic codes is a recent invention patented by Thomas M. St. John, of New York City. The device reproduces both the sound of the wire telegraph or wireless telegraphy signals.

In the accompanying drawing: Fig. 1 is a diagram showing the pieces of apparatus and appropriate circuit connections; Fig. 2, a plan view of the code plate; and Fig. 3 shows a modification.

One is an electromagnet of which 2 is the armature lever and 3 the armature lever stop. This may be deemed to be an ordinary sounder. It is shown, however, so that it may be used also as a buzzer. On the armature lever is the ordinary buzzer contact spring 4. One pole of the battery B is connected through the windings of the magnet and by wire 5 to one of the contact points 6 of a two-point switch 7. Wire 5 is connected to the fixed contact stop 3 co-operating with the spring 4 and switch contact 8 is connected to the armature lever. The

Fig. 1.

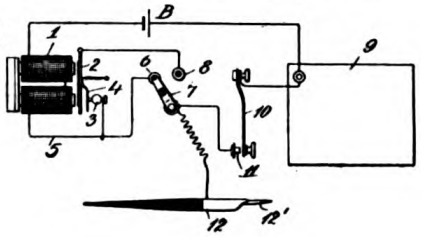

Fig. 2.

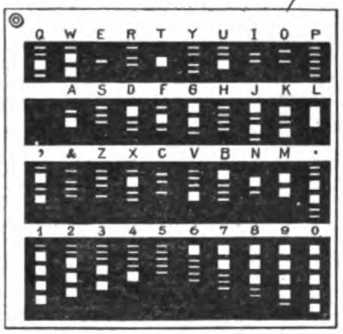

Fig. 3.

opposite pole of the battery is connected to a plate 9 herein called the code plate and also to the lever 10 of a normally open Morse key. The bottom contact 11 of the key is connected to swtich 7 which latter is also connected by a flexible wire to a pointer 12. Preferably, the handle of the pointer is of insulating material and may be of wood. It is only necessary that the point 12' should be connected with switch lever 7. When the switch is in the position shown in the draw-

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ing, the key 10 may be operated according to the Morse or other code and solid dots and dashes will be sounded by magnet 1. If the switch, however, be transferred to the point 8, the magnet acts as a buzzer and the dots and dashes have the characteristic sound of wireless telegraph signals. The code plate 9 may, as in Fig. 2, be of metal having a facing or coating of enamel or other insulating material through which are openings exposing the surface of the plate. The widths of the exposed surfaces correspond with dot and dash signals. For instance, the letter *q* is shown as formed by two narrow exposed surfaces of the metal plate representing two dots, then by a wider exposed surface representing a dash and finally by a narrow exposed surface representing a dot. In this way, the entire alphabet of any code may be represented. The constituent parts of each signal may be disposed vertically as shown in the drawing or they might be horizontally disposed; and, if the plate shown is turned upon its side, they will be horizontally disposed. Now, if the learner draws the contact point 12′ across the exposed plate surfaces representing dots and dashes for the formation of any code character, the dots and dashes would be audibly reproduced by the magnet either as solid dots and dashes or buzzer dots and dashes according to the position of switch 7.

With a little practice, one may quickly learn any dot and dash code Of course, the code plate may be prepared in any other way to effect the result desired; and, instead of the dots and dashes being formed by dot and dash impulses transmitted through the exposed metal surfaces of the plate, they may be formed by interruptions of a closed circuit, in which case the dot and dash characters on the plate would appear as areas of insulating material, as indicated in Fig. 3, which shows a section of the plate with the characters *q*, *w*, *e*, placed thereon in the manner last described.

Szechenyi's Submarine System

An underwater signal system useful to our battleships when their wireless is shot away, is an invention brought to this country by Count Szechenyi, husband of Gladys Vanderbilt. The Count himself did not invent the device, enthusiastic society reporters to the contrary notwithstanding.

The inventor is another Hungarian, Christian Berger, vice-president of the Torpedo Research Society of Budapest. Count Szechenyi is his financial backer.

Thorough and secret experiments carried on at Newport and Provincetown by the navy during the summer months have served to prove that there is more than a possibility in this system of submarine signaling. The Count is president of the Torpedo Research Society and Mr. Berger has done a great deal of work in Austria-Hungary, where he is known as a physicist. His investigations on the subject of sound waves have been exhaustive and his machine for underwater signaling is simply a sound wave producer and receiver.

It consists of a wire stretched between the sides of a steel vessel. The wire is at such a tension that it will produce a high musical note when vibrated by an alcohol-soaked, silk-covered disk, revolving at high speed. The sides of the vessel act as a sounding board and water, of course, is a splendid transmitting medium. The receiving apparatus is the ordinary sensitive microphone of wireless operators. Levers and springs control the application of the motor-driven disk to the wires and enable the operator to "send" in dots and dashes.

All experiments have been secret and it was only recently when the Submarine Wireless Company was incorporated by Count Szechenyi, Eugene N. Robinson, his attorney, and John M. Russell, that the first news of a new system of underwater signaling leaked out.

It is reported that a London telegraph company is hiring girls to replace messenger boys. Leave it to a girl to carry messages.

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More Marconi Patent Victories

ANOTHER step toward the rapid clearing up of the complexities of the wireless patent situation is the announcement by H. E. Stauffer, Examiner of Interferences of the United States Patent Office at Washington, that a decision has just been rendered awarding priority of invention to Guglielmo Marconi over the wireless inventions of Prof. Reginald A. Fessenden.

The invention specified involved a transmitting apparatus for wireless telegraphy. Fessenden contended that since his application was filed while the application of Marconi was pending, it appeared that Marconi's patent, No. 935,381, issued September 28, 1909, was inadvertently granted in view of Fessenden's application. He also alleged that an earlier application filed by him in 1906 contained features substantially the same as those in the patent granted Marconi. This motion was denied on the ground that it was not brought within the time allowed for filing motions, but Fessenden was permitted to introduce the earlier application in evidence. The right of Fessenden to go back to his earlier application was made an issue, but the Patent Office could not find that the subject-matter of Marconi's invention was disclosed therein. And as Fessenden's later application, which was the one directly involved, was substantially the same as his earlier application it was decided that he had no right to make the issue and the award must be to Marconi.

The Fessenden wireless patents are owned by the National Electric Signaling Company, of Pittsburgh, now in the hands of receivers. At the time when it was first announced that the Marconi Company was to acquire the assets of the bankrupt United Wireless Telegraph Company, the Pittsburgh concern asked the courts to stop the sale pending a settlement of the suit they had entered against the United Company charging infringement on the Fessenden patents. The final decision established the validity of the United patents and they were sold, along with the other assets of the bankrupt, to the Marconi Company.

As we go to press word comes that the motion made by the National Electric Signaling Company for a rehearing of the suit just mentioned has been denied in an opinion handed down by Judges Colt, Aldrich and Brown in the United States Circuit Court of Appeals. The court stated that nothing appears to show that the court misunderstood the invention disclosed by the patent in question.

Two suits for injunctions and damages for the infringement of wireless telegraph patents have been brought in the United States District Court of California by the Marconi Wireless Telegraph Company of America against the Federal Telegraph Company, which operates the Poulsen system of wireless telegraphy in a small way.

The patents involved cover basic inventions of Guglielmo Marconi, and the English Scientist, Sir Oliver Lodge. Two of the patents have already been adjudged valid and held to have been infringed by the United States District of New York.

The bills of complaint in these suits allege that the Federal Telegraph Company is making and using the apparatus and system of these wireless telegraph patents, and claim that the Marconi Company is entitled to an injunction restraining the Federal Company and its associates from the infringement of the patents, and that the Marconi Company is entitled to a large amount of damages and profits which it has sustained by reason of the Federal Company's infringement. If the claims of

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the Marconi Company in these suits are sustained, the Federal Company will be obliged to discontinue the use of the infringing wireless telegraph apparatus and compelled to pay damages to the Marconi Company.

THE NEW WIRELESS LAW—(*Cont'd*)

prisonment for a period of not exceeding three months, or both fine and imprisonment, in the discretion of the court.

PENALTIES.

For violation of any of these regulations, subject to which a license under sections one and two of this Act may be issued, the owner of the apparatus shall be liable to a penalty of one hundred dollars, which may be reduced or remitted by the Secretary of Commerce and Labor, and for repeated violations of any of such regulations, the license may be revoked.

For violation of any of these regulations, except as provided in regulation nineteenth, subject to which a license under section three of this Act may be issued, the operator shall be subject to a penalty of twenty-five dollars, which may be reduced or remitted by the Secretary of Commerce and Labor, and for repeated violations of any such regulations the license shall be suspended or revoked.

SEC. 5. That every license granted under the provisions of this Act for the operation or use of apparatus for radio communication shall prescribe that the operator thereof shall not willfully or maliciously interfere with any other radio communication. Such interference shall be deemed a misdemeanor, and upon conviction thereof the owner or operator, or both, shall be punishable by a fine of not to exceed five hundred dollars or imprisonment for not to exceed one year, or both.

SEC. 6. That the expression "radio communication" as used in this Act means any system of electrical communication by telegraphy or telephony without the aid of any wire connecting the points from and at which the radiograms, signals, or other communications are sent or received.

SEC. 7. That a person, company, or corporation within the jurisdiction of the United States shall not knowingly utter or transmit, or cause to be uttered or transmitted, any false or fraudulent distress signal or call or false or fraudulent signal, call, or other radiogram of any kind. The penalty for so uttering or transmitting a false or fraudulent distress signal or call shall be a fine of not more than two thousand five hundred dollars or imprisonment for not more than five years, or both, in the discretion of the court, for each and every such offense, and the penalty for so uttering or transmitting, or causing to be uttered or transmitted, any other false or fraudulent signal call, or other radiogram shall be a fine of not more than one thousand dollars or imprisonment for not more than two years, or both, in the discretion of the court, for each and every such offense.

SEC. 8. That a person, company, or corporation shall not use or operate any apparatus for radio communication on a foreign ship in territorial waters of the United States otherwise than in accordance with the provisions of sections four and seven of this Act and so much of section five as imposes a penalty for intereference. Save as aforesaid, nothing in this Act shall apply to apparatus for radio communication on any foreign ship.

SEC. 9. That the trial of any offense under this Act shall be in the district in which it is committed, or if the offense is committed upon the high seas or out of the jurisdiction of any particular State or district the trial shall be in the district where the offender may be found or into which he shall be first brought.

SEC. 10. That this Act shall not apply to the Philippine Islands.

SEC. 11. That this Act shall take effect and be in force on and after four months from its passage.

Careful study of the foregoing regulations will reveal the fact that our Government has at last awakened to the danger of passing hurriedly drafted bills for regulating radio communication. What a contrast it presents to the original Alexander Wireless Bill! Whether it was the ridicule aimed at that bill when it was first made public or whether the suggestion of Minority Leader Mann that the framing of laws harnessing wireless communication was a subject that required considerable study and deep consideration, which influenced its revision is a detail. The fact that as a law it now provides for the actual regulation of legitimate wireless communication without exterminating the amateur, stamps it as a creditable achievement.

From the viewpoint of the amateur the law is an excellent one. He now knows just where he stands, knows exactly what his rights are, and in place of being considered a pest, his experiments are endorsed by the Government. All that is required is that he use a wave length not greater than 200 metres, nor a greater power than 1 kw. or if within five nautical miles of a Government station, a power greater than ½ kw. This law has given the amateur all the privileges he could reasonably desire—and only demands that he shall not wilfully interfere with other people's business.

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